August 27, 1945

STEEL

The Magazine of Metalworking and Metalproducing

ECHNOLOGY DEPT

ESTABLISHED 1882

WORTH

SHEARED STEEL PLATES

FLANGED & DISHED HEADS

WORTH STEEL CO.

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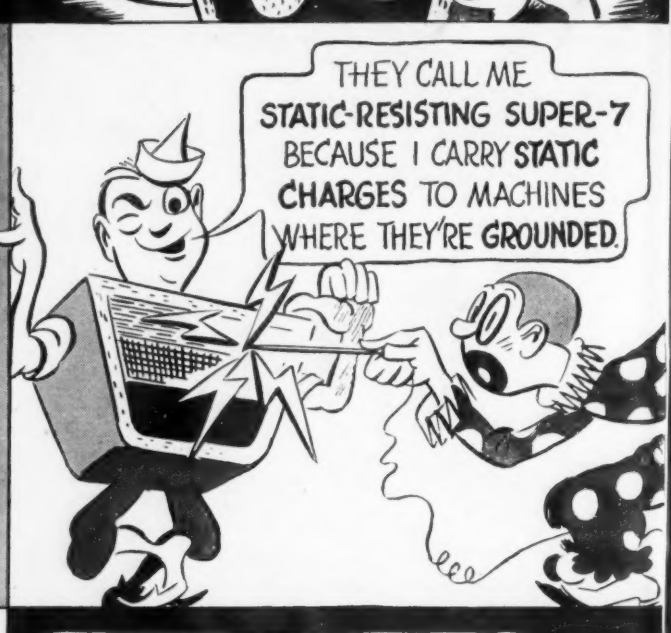
Greatest V-Belt Show ON EARTH!

EVERY MEMBER OF ALLIS-CHALMERS GREAT NEW V-BELT TEAM IS SPECIALLY DESIGNED, TESTED AND BUILT TO LICK A SPECIFIC DRIVE PROBLEM, SAVE YOU MONEY AND TROUBLE

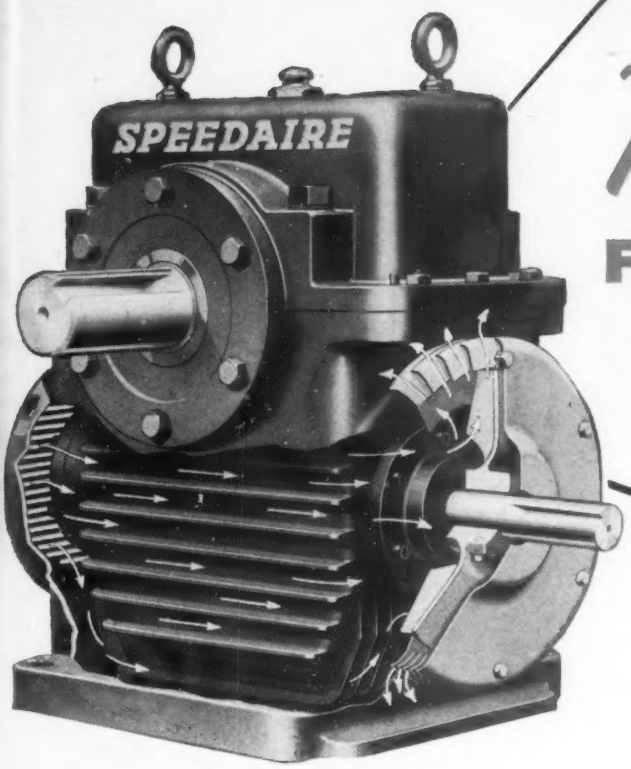


DON'T WORRY IF YOUR BELTS MUST PRACTICALLY BATHE IN OIL OR GREASE. JUST ASK FOR SUPER-7 OIL-PROOF. I'M MADE OF IMPERVIOUS NEOPRENE.
OIL

IT PAYS TO MAKE **ALLIS-CHALMERS** YOUR

V-BELT DRIVE HEADQUARTERS

Texrope Super-7 V-Belts result from the cooperative research of two great companies—Allis-Chalmers and B. F. Goodrich—and are sold exclusively by A-C.



"New SPEEDAIRE FAN-COOLED UNIT?

If Cleveland makes it —we can O. K. it"

From the Chief Inspector's Viewpoint:-

● "The Drive's the thing—it's my business to be mighty particular about the Reduction Units that are installed on the equipment we build. I know by experience that our customers can forget power failures when Clevelands go on our machines—because Clevelands can take it, even on 24-hour schedules.

"Now the new Speedaire Fan-Cooled Units are coming through and we see *still better* Worm Gear Performance ahead. Cleveland builds them —that's recommendation enough."

Speedaire is the trustworthy Cleveland Worm Gear Unit you have appreciated for years, plus Fan-Cooling to give you *More Horsepower for Your Dollar.* We'll be glad to send Bulletin 300.

THE CLEVELAND WORM & GEAR COMPANY
3270 East 80th Street • Cleveland 4, Ohio
Affiliate
THE FARVAL CORPORATION, *Centralized Systems of Lubrication*
In Canada: Peacock Brothers, Limited

Install Speedaire — Cleveland's Fan-Cooled Unit — and Profit by a New Standard of Worm Gear Performance

- The Induction Fan continually removes heat by means of a high-velocity air stream scouring the surfaces of the oil reservoir.
- Because Speedaire is Fan-Cooled, it will do more work —and deliver up to *double the horsepower* of standard worm units of equal frame size, at usual motor speeds.
- Speedaire can be installed economically on many applications where other types have been used heretofore—giving you the advantages of a compact right-angle Drive.
- Speedaire is furnished in 6 Standard sizes—from 3 to 95 H.P.

Cleveland SPEEDAIRE *Worm Gear Reduction Units*
FAN COOLED

FOR QUICK DELIVERY—
FOR DEPENDABLE QUALITY
OF 52100 TIMKEN
SEAMLESS STEEL TUBES
ORDER FROM OUR MILL STOCK OF 99 SIZES

Write today for stock list of seamless 52100 seamless tubes that lists complete range of 99 sizes, prices, tolerances and finishes.

No waiting - - no delays - - when you order 52100 Timken Seamless Steel Tubes from our mill stock of 99 sizes that range from 1" to 9.228" O.D. Your orders for stock sizes will be shipped within 24 hours after they are received.

When you buy 52100 seamless tubes from our mill stock you can be sure of receiving material of uniform and dependable quality. Every manufacturing step of these tubes is closely guarded by one organization that melts the steel, rolls the billets and pierces the tubes.

Widely used in the anti-friction bearing industry and for many mechanical applications, 52100, is a through hardening, oil quenching steel which in the "as-quenched" condition has a maximum hardness of 65 - 66 Rockwell C.

For quick delivery - - for dependable quality - - mail, wire or phone your orders for 52100 seamless steel tubes to Steel and Tube Division, The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
SEAMLESS STEEL TUBES

FLANGED AND DISHED HEADS

for every industrial requirement

Bethlehem's up-to-date spinning machines and presses turn out flanged-only and flanged-and-dished heads in diameters from 10 in. to 144 in. (for special needs, even larger diameters are possible)—and in thicknesses from 1/8 in. to 4 in.

Bethlehem heads are formed hot, then air-cooled slowly to reduce internal strains and stresses. Adjustable spinning machinery makes possible variations of outside diameters, knuckle radii and straight flange dimensions, without any need for special dies and machine set-up charges. Heads are finished with smooth, regular contours.

The complete list of Bethlehem flanged-and-dished products includes: Heads: flanged-only, standard flanged-and-dished, ASME Code flanged-and-dished, tank-car, elliptical, obround-tank and double-dished; also standard manholes and covers, hand holes and covers, flue holes, collar and pipe flanges.

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.
Bethlehem Steel Export Corporation, New York City

★ BETHLEHEM STEEL ★

Eighteen operations

Contour turning and boring this cream separator stem cover, and the stem itself, take only two operations for each piece, on the Monarch Magnamatic. Previous methods required 20 operations per piece.

In use, the stem and cover assembly rotates at 7000 rpm, so balance must be perfect to prevent wrecking the mechanism. Extreme thinness of walls (maximum 1/8") calls for delicate precision. Complete interchangeability of millions of pieces demands exact uniformity. All these are met with the Monarch Magnamatic.

This job illustrates how, with modern tools, mass production methods can be applied to the most difficult jobs, to reduce prices and thus enlarge markets. Our engineers will gladly work with you to help you cut your costs and improve your production with Monarch turning machines.

THE MONARCH MACHINE TOOL COMPANY • SIDNEY, OHIO

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10465 Carnegie Avenue
Phone: Garfield 2590

DETROIT 2, MICHIGAN
801 Fisher Building
Phone: Trinity 1-0426

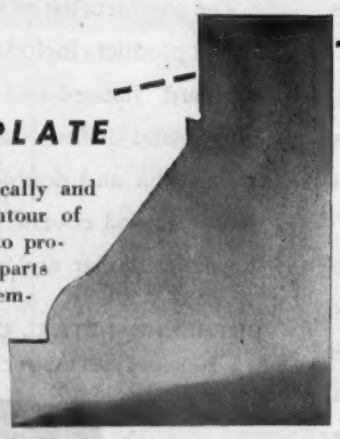
INDIANAPOLIS, INDIANA
Maco Building
38 and College Avenue
Phone: Wabash 2650

NEWARK 2, NEW JERSEY
635 Industrial Office Bldg.
Phone: Mitchell 2-1770

PITTSBURGH 22, PENNSYLVANIA
512 Empire Building
Liberty Ave. and Stanwix St.
Phone: Atlantic 6428

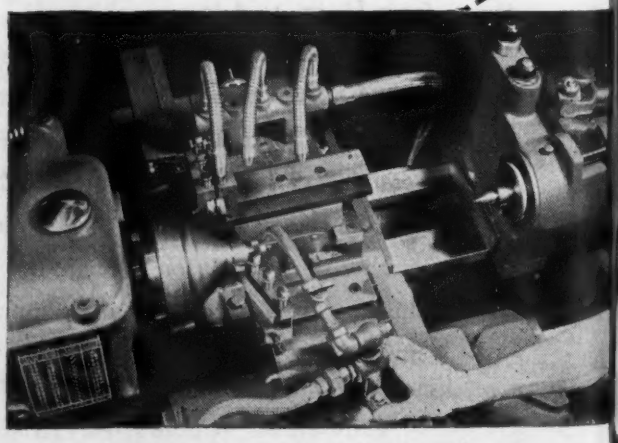
Representatives in Principal Cities

...WITH A SIMPLE TEMPLATE



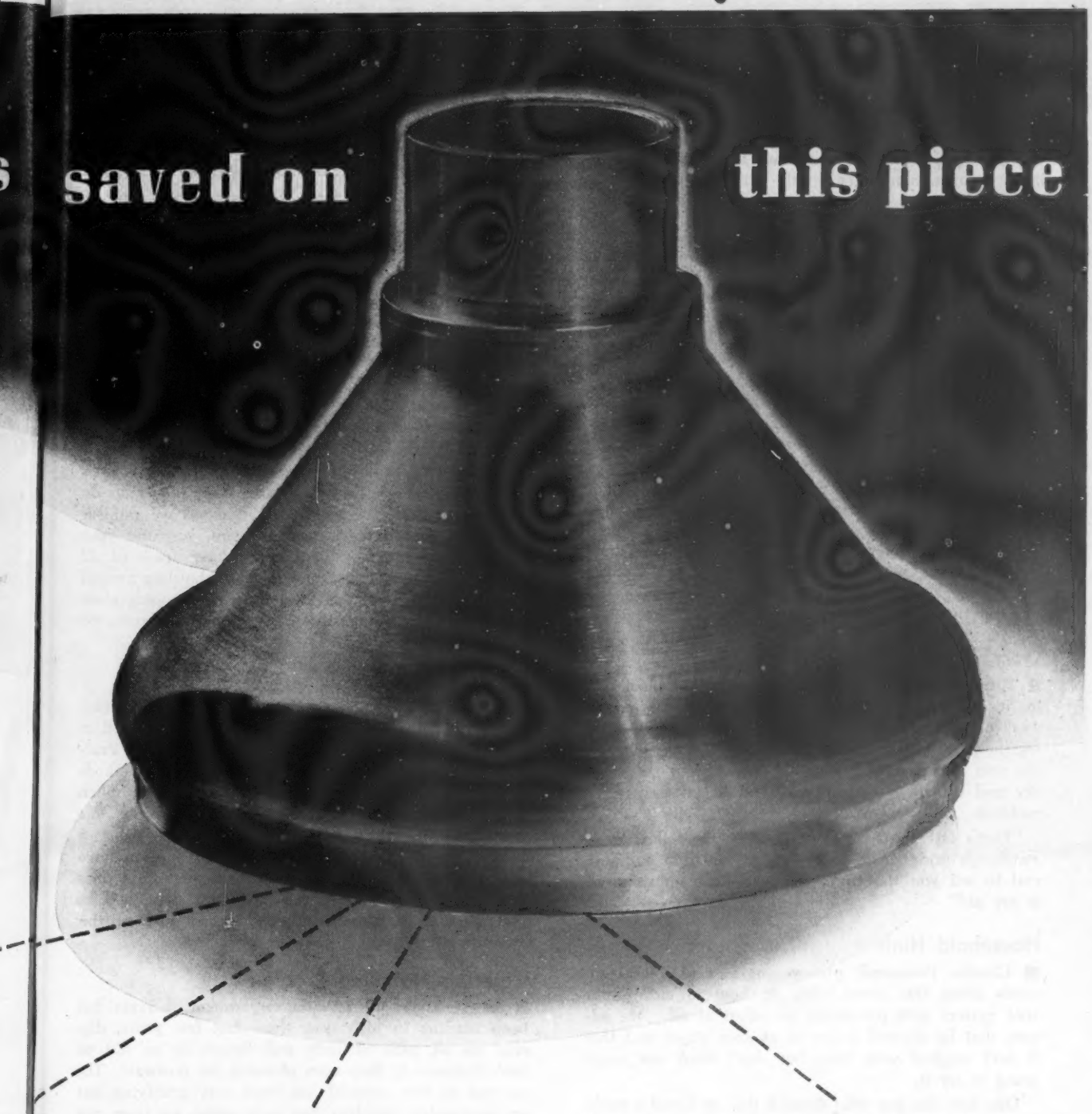
The cutting tool automatically and accurately follows the contour of the thin metal template, to produce two or two million parts with equal accuracy. Template can be stored and used again at any time, and resulting parts will be perfect duplicates of the original run.

...AND SETUP LIKE THIS

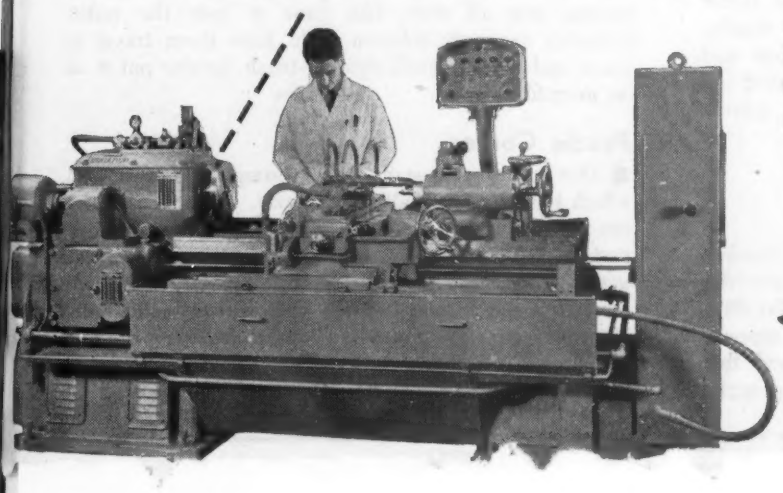


Only one setup is required for each of the operations of contour turning the outsides of the two pieces, and contour boring the insides. Once the setup is made, the operator need only insert and remove the workpiece—and can readily attend two or more machines. Setup time from one job to another takes from 10 to 30 minutes, faster than on any other turning machine in the world.

saved on this piece



..ON A MONARCH MAGNAMATIC!



This turning machine is fully automatic, all electrically controlled. Six different feed rates can be automatically selected, depending upon depth of cut and finish required. One button on control panel starts the complete operating cycle. An endless variety of turning, boring and facing work can be done on this improved Magnamatic.

Monarch Saves Time

BEHIND THE SCENES

No Improvement

■ While we were sitting around the house the other night, carefully hoarding the last two cigarettes, we listened to an announcer on the Chesterfield program telling what a terrible thing the cigarette shortage *has been*, and now that it's all over, etc., etc. Why doesn't somebody tell the cigar store on the corner about these things? He never seems to have any cigarettes at all, let alone the kind we like.

Some Improvement

■ Pretty much the same thing is true of the metalworking industry. While the WPB issues a lot of orders indicating that wartime demand has ended, and that it is now okay to go ahead and make safety pins and dish drainers, refrigerators and automobiles, we are continually hearing screams from the manufacturers who go to the corner steel store and find out there isn't any steel to be bought. Things are a little better, though, because in a Cleveland department store you can buy a shiny new electric refrigerator if you have about 700 bucks to slap down for it and a kitchen with rubber walls which will stretch large enough to hold the thing, which is some 20 cubic feet in capacity.

Good Old Smog

■ This story comes from the Curtiss Wright plant out in St. Louis. A fellow from Pennsylvania started to work out there and was always complaining about the weather. A couple of guys finally grabbed him by the arm and took him outside to show him the clear sky and explain how St. Louis had licked the smoke problem.

"That's just it—that's what I miss", the fellow from Pittsburgh said. "You've got the air too thin out here and to tell you the truth, I like a little nourishment in my air!"

Household Hints

■ Charles Townsend, process engineer of Cleveland, sends along this clever idea on how to clean your roof gutters with practically no effort at all. He admits that he clipped it out of another paper and that it isn't original with him, but don't think we aren't going to try it.

One day, the guy who thought this up heard a peck-peck-peck against one of the gutters and saw a bird looking for some bits of food in the gutter and in the process of the search, it was using both feet to throw out the refuse. So, he bought ten pounds of regular chicken scratch food, sprinkled it in the gutters and waited—but not for long. The birds came, kicked out all the refuse and ate the food, leaving the gutters clean.

My, isn't this postwar world wonderful!

Mr. Youcheff's Miracle Salve

■ One of our good readers who apparently was checked in the Hotel Roosevelt in N. Y. as he was persuing STEEL wonders if those steel collars of Civil War days, which we mentioned, wouldn't make staunch supports for some of the iron heads of the 1940's. And then he adds a clipping from the *Wall Street Journal* plugging the new stuff which one Mr. Slav B. Youcheff has developed to grow hair on those iron domes.

If what they say about it is true, there's millions in it, because Mr. Youcheff's wonder ointment is actually supposed to grow hair on a bald head. The stuff is about ready to be put on the market at $2.50 for a six weeks' supply, at the end of which time even the most stubborn cases should begin to show the beginnings of an hirsute adornment. So, have faith, if your pate is showing more and more, Mr. Youcheff will shortly come to your rescue.

New Faces Dept.

■ We have a couple of new additions to the staff. On the technical staff is John Parina Jr., a metallurgist who comes to STEEL from the American Steel & Wire Co., while the army has released PFC Frederic Baker and he has now become Fred Baker of STEEL's news staff. They're both going to have plenty to do trying to help fill the more-than-70 pages we publish each week for the information of you, you and your assistants and bosses. It's hard to keep track of all the editorial staff, because they're busy shuttling around the country, but what we believe to be a source close to the subject says we now have in round figures 35 editorial staff members.

Hot Stuff Coming Up

■ Coming up September 3 is the first of five articles which you won't want to miss if you're interested in heat treating. Entitled "Modern Heat Treating Practice," this series will cover tried & proved methods over a wide range of applications and will supply much basic information on current heat treating methods. We might add that the paper situation is slightly better at the moment, and if you want to be sure to have this series of articles and some equally important ones scheduled for later issues, our circulation dept. will be most pleased to take your subscription, rates at the bottom of this page in the fine print.

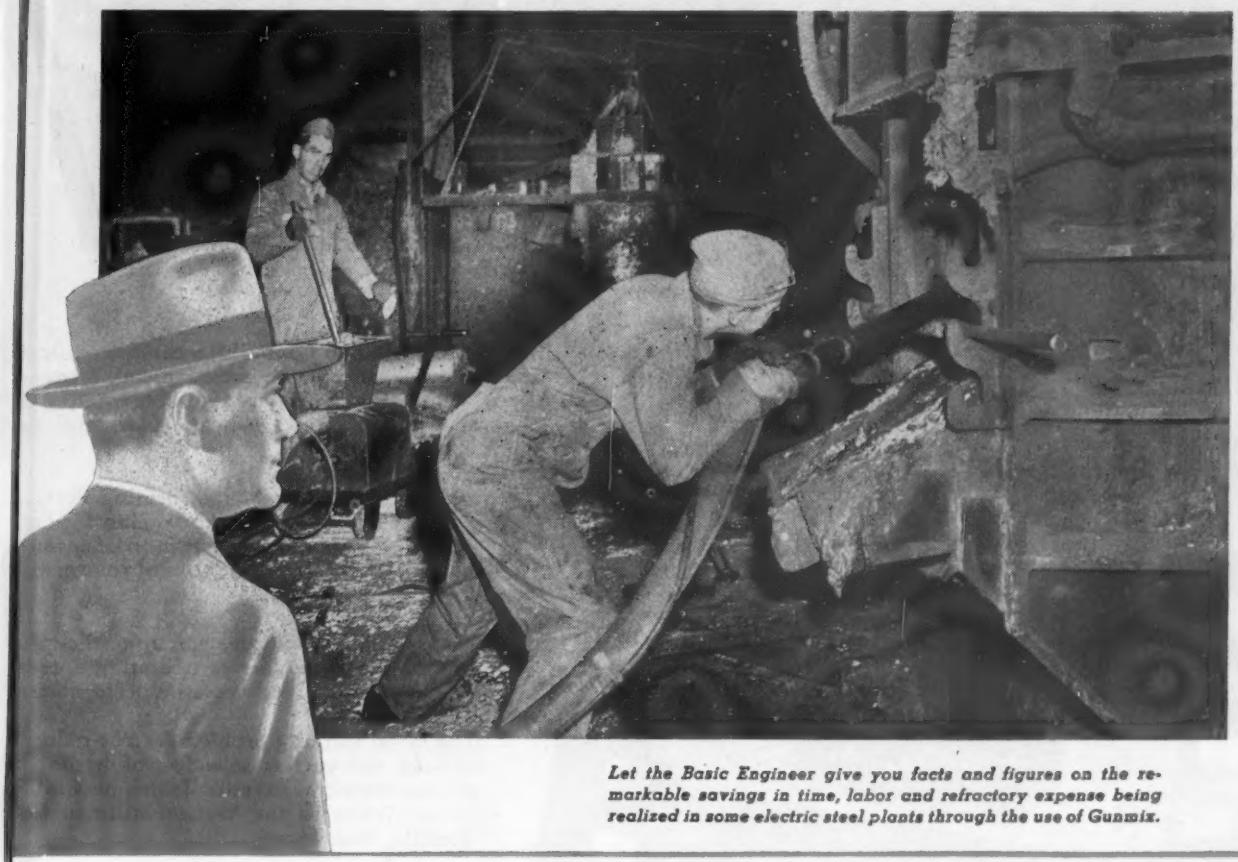
Materials Handling Problem

■ As you know, the research department of STEEL has been running in high gear these last few years, digging up all sorts of facts and figures as an aid to manufacturers in their own planning for postwar. The reaction to this material has been very gratifying but an unexpected problem has now come up from our representatives who tote all this stuff around. Their arches are giving way and their regular brief cases are busting out all over, like June is over the radio. Probably the only solution is to have them travel in pairs, and carry a small steamer trunk, or else put it all on microfilm.

Puzzle Corner

■ Our engineering staff comes through with this gem, which they say is a legitimate puzzle. What is it which can be purchased in a dime store or a hardware store, costs a nickel for one, a dime for ninety, and you can get a hundred for fifteen cents? Please, somebody figger out the answer because we're slowly going nuts. The doggone editors won't tell us the answer till next week!

SHRDLU



Let the Basic Engineer give you facts and figures on the remarkable savings in time, labor and refractory expense being realized in some electric steel plants through the use of Gunmix.

PROFIT FROM THIS OLD CHINESE CUSTOM

EVERYBODY has heard the saying that in China you pay the doctor to keep you well.

Isn't that the wise way to look after the health of your basic open hearth and electric furnaces, too? Isn't it more efficient practice to keep furnace hearths and linings in sound condition, than to permit them to deteriorate at an accellerating rate until you have to shut down and rebuild?

Take for example, basic electric furnace sidewalls! Some operators delay an extra 30 to 50 minutes about once a week to give the hot sidewalls a coat of Gunmix, with the Gunmix Gun. This keeps the walls firm and clean and actually prolongs their useful life a hundred heats or more. Furthermore, accurately recorded costs show that this maintenance practice, as compared to shutting down for frequent relining jobs, not only reduces refractory costs, but also results in more hours of steel production.

There is a "doctor" ready to help you protect the good health of your furnace walls, banks and bottoms—the Basic Engineer. He is a graduate of the school of experience. He knows steel production because he has actually made steel. He talks the steel man's language, diagnoses a tough case and prescribes successful refractory treatment. Regular consultations with him will keep your furnaces well.

BASIC REFRACTORIES, INCORPORATED

845 HANNA BUILDING
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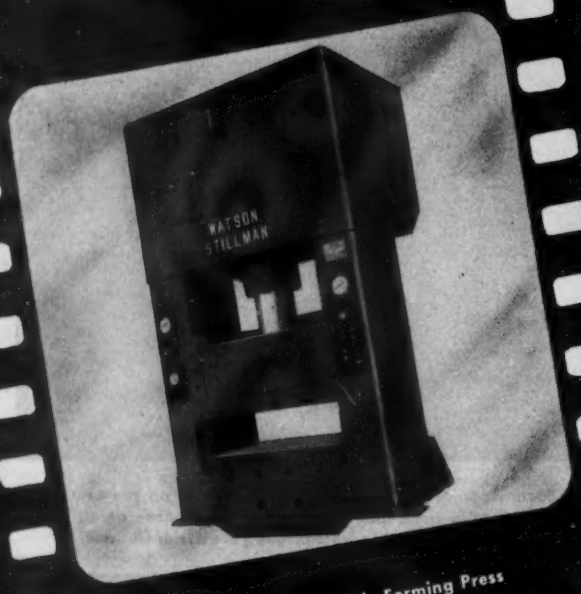
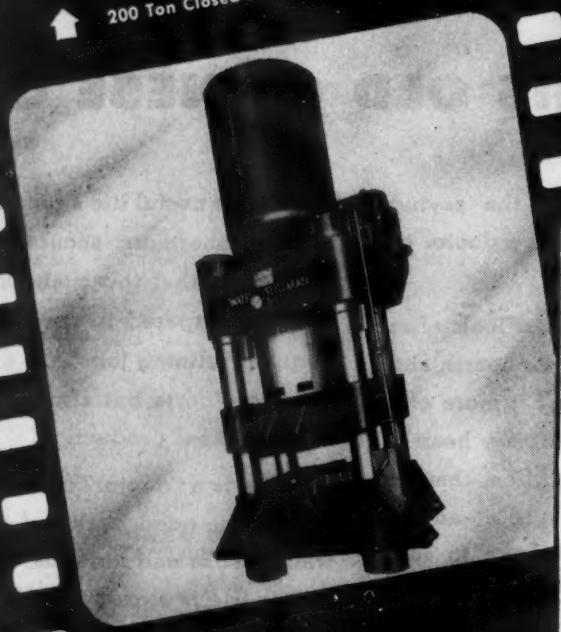
Meet Tomorrow's Competition . . . with Speedy, Accurate, Low cost METAL FORMING



200 Ton Closed Side Forming Press



1300 Ton Forming Press

The Watson-Stillman Co. builds a complete line of single, double and triple action metal forming presses—Models and sizes are available for deep or shallow drawing or large heavy parts and for light gauge work.

A standard model W-S Metal Forming Press is available to meet the post-war demand for fast, accurate and economical production of formed metal parts and to lower the costs of your metal-working department.

W-S engineering will give you up-to-the-minute press controls, correct operating speeds, low maintenance, and versatile performance.

Your metal forming problems can be reduced through the correct selection of hydraulic press equipment. Investigate this possibility today. Write to the Watson-Stillman Co., Roselle, New Jersey.

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Handles ANYTHING- ANYWHERE!

FROM 4 1/2 to 44 TONS

YOU don't ask yourself—you don't wonder how you are going to move materials or handle things when you have a Northwest Crawler Crane. There is no question about what you can handle or where your Northwest will go. There are no limitations such as rail or trolleys, or overhead supporting structure and there are no problems with fuel or ashes as with steam equipment.

No other type of material handling equipment will do what a Northwest Crawler Crane will do. It handles anything within its capacity. It goes anywhere where there is clearance.

It piles high or low, stacks, unloads cars, handles construction jobs and can be equipped with any type o handling equipment that can be a tached to a cable. On top of that brings definite and exclusive adva tages that make it faster, easier to o erate and lower in maintenance cos There is a capacity for every proble

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NORTHWEST

The Crane that goes Anywhere!

BULLETIN!

How to Take a Reconversion Inventory of Your Centrifugal Pumps

☛ As new manufacturing equipment becomes more widely available, and as you reconvert your production toward a peacetime basis, you may be faced with an unprecedented problem of inventory-taking.

☛ You may have to determine — more quickly than such a job has ever been done before — the EXACT CONDITION of every piece of existing equipment you propose to use in peacetime production.

☛ For about four years, far greater emphasis has been placed on setting production records than on keeping maintenance records; condition of equipment is often unknown. Because much equipment has been worked during wartime three and four times as many hours a year as in peacetime, calendar age may mean nothing. Much equipment has, through necessity, been mis-applied. And repair has often depended on American ingenuity and baling wire.

☛ Here are some of the standards you need to determine which of your centrifugal pumps: (1) are OK as is, (2) need new parts, (3) will shortly require replacement, (4) need immediate replacement, (5) need reapplication, (6) are obsolete, (7) may have parts of second or third-choice materials that were dictated by wartime shortages.

☛ These standards generally apply to all makes of centrifugal pumps; when in doubt on any pump, consult its manufacturer.

1 START YOUR INVENTORY WITH THE RECORDS

Begin your pump inventory with the *history* of *each* pump; you'll save much time and effort . . . you'll be guided quickly to the units which most need attention. Written records or the mental recollection of foremen and maintenance men are the source of this information.

Check the *master maintenance records* (though in most plants this file is out-of-date and incomplete, because of wartime pressure on production); and get *reports from foremen* (in a small plant, it may be possible to interview each man; in a large plant, it may be more efficient to circulate blank forms — such as the "Pump Check List" shown at right).

Then, master mechanic or other member of maintenance department can study these records for: evidence of recurring trouble; misapplications (wrong capacities, wrong motors, wrong type of pump); obsolete equipment (usually indicated by excessive power consumption or excessive maintenance).

NOTE: Wartime restrictions on the use of certain critical materials in pump manufacture made necessary the use of substitute grades in *all* centrifugal pumps made in the United States after May, 1942. If *purchase records* reveal the acquisition of any pumps since that time, inspection of impellers, sleeves, wearing rings, and coupling parts may reveal more than normal wear.

• • •

2 CHECK PUMPS IN OPERATION

After checking the records, watch the units in action. Check for:

Capacity, efficiency, and head. Note the quantity of liquid delivered, the power consumption, and the net head measured in feet. Do these values approximate the ratings stated on the data plate? If not, something is wrong.

Suction lift. Has suction lift increased beyond limits for which pump was purchased? If so, performance may be impaired. Usual maximum for cold water is 15 feet. Inspect for clogged foot valve or screening.

Alignment of motor and pump shafts. Check this with a straightedge and feeler gauge.

Bearing temperature. Internal heat should not exceed 170°F (75°C).

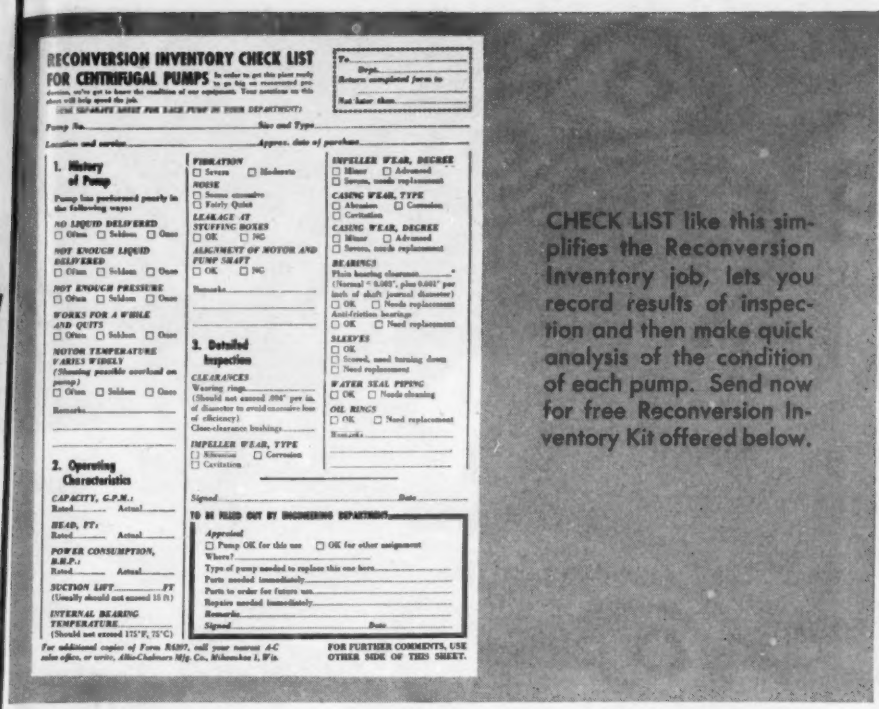
Degree of leakage at stuffing boxes. There should always be *some* . . . experience alone can tell you how much for each pump.

Excessive Vibration or Noise. Has there been a marked increase?

• • •

3 CHECK THE PARTS

To disassemble pump for detailed inspection, you'll need the usual tools, including wrenches, soft hammer, inside and outside micrometers, calipers, steel rule, and feeler gauges.



RECONVERSION INVENTORY CHECK LIST FOR CENTRIFUGAL PUMPS

CHECK LIST like this simplifies the Reconversion Inventory job, lets you record results of inspection and then make quick analysis of the condition of each pump. Send now for free Reconversion Inventory Kit offered below.

Procedure for disassembly and detailed inspection:

1. Shut off pipe valves and disconnect motor current. Remove nuts and lift off upper half of pump casing.

2. Examine *wearing rings* and *close-clearance bushings*. With feeler gauge, measure clearances between stationary and rotating parts. (If a lip on the wearing ring makes it impossible to measure clearance with feeler gauge, remove rotor and measure the two diameters; calculate difference to find clearance.) Maximum clearance is 0.004 in. per inch of diameter to prevent excessive loss of efficiency.

3. Inspect *impeller* (rotor, or runner) for wear. This may be one or more of three types:

a. Abrasion — wear by bits of grit or the like in the pumped liquid. Check for this with sediment test — let a quantity of the liquid stand in a glass; examine any resulting sediment for abrasive matter.

b. Corrosion — eating-away by chemical action. A chemical laboratory analysis of the pumped liquid vs the material of the impeller will reveal whether this is your cause of impeller wear. (If you have no chemical laboratory of your own, Allis-Chalmers will be glad to handle this analysis for you. Address a sample of liquid and details of use to Centrifugal Pump Dept., Allis-Chalmers, Milwaukee.)

c. Cavitation — localized pitting; usually indicated by a "pinging" or "cracking" sound when pump is in action; usually means too high a suction lift.

If wear has reduced the impeller blades to half their original thickness, a spare impeller should be ordered and kept on hand. (Original thickness may be found by measuring an unworn section).

4. If impeller is worn, check also the *casing*, for the same causes may produce the same effects here. Check casing thickness (usual way is to measure through an available opening); here again, reduction to half the original wall thickness may be dangerous.

5. *Measure bearing clearances* for wear. If sidewise "play" of the impeller shaft is noticeable, remove bolts and upper halves of bearing housings; dismantle bearings and measure their clearances with feeler gauge to determine if clearance is appreciably more than normal. Normal sleeve bearing clearances may be computed this way: take 0.003 in. as the basic tolerance... then add 0.001 in. for each inch of shaft journal diameter.

To examine anti-friction bearings, first clean them thoroughly with kerosene to remove all old grease and dirt particles; then hold inner race and rotate outer race, feeling for roughness of action and listening for noise. Replace overworn bearings; if not overworn, simply flush bearing and replace lubricant of grade recommended by manufacturer.

6. Inspect *sleeves* for scoring or wear. If: (1) grit has entered the packing in the flow of liquid from the water seal piping, or (2) packing has become old and hard, or (3) packing has pulled up too tight, or (4) packing is not getting proper lubrication . . . there will be scoring of the sleeve between the end of the gland and the end of the stuffing box bushing. If this scoring is slight, sleeve can be turned down. Scoring as deep as 1/8 in. on diameter, however, usually calls for a new sleeve. Or if scoring is such that stuffing box cannot be packed or box leaks excessively, no matter how deep the scoring, sleeves must be replaced. Never fail to replace or turn down a scored sleeve; scoring not only wears packing, but may also increase the horsepower input.

7. Check *water seal piping*. If your check of the pump in operation showed no liquid leakage at the glands, and if packing and lantern ring are okay (lantern ring must align with water seal piping outlet), then clean out water piping; it must be clogged.

8. Check oil rings to see that they run freely. Hot bearings may mean stuck rings. Clean out oil grooves.

Having studied each pump's history, noted its operating characteristics, and made a detailed inspection of its essential parts, you can now compare your supply of pumps on hand against known needs for reconverted production.

• • •

ELECTRIC MOTORS, V-BELT DRIVES NEED RECONVERSION TOO!

To speed your reconversion job, Allis-Chalmers has prepared a new *Reconversion Inventory Kit* — fact sheets and check lists on centrifugal pumps, motors, and v-belt drives. A 1814

GET THESE FREE FORMS!

For your supply of Reconversion Inventory Kits, covering centrifugal pumps, motors, and v-belt drives, call your nearest Allis-Chalmers district office or distributor, or write Department 206, ALLIS-CHALMERS MFG. CO., MILWAUKEE 1, WIS.

ALLIS CHALMERS

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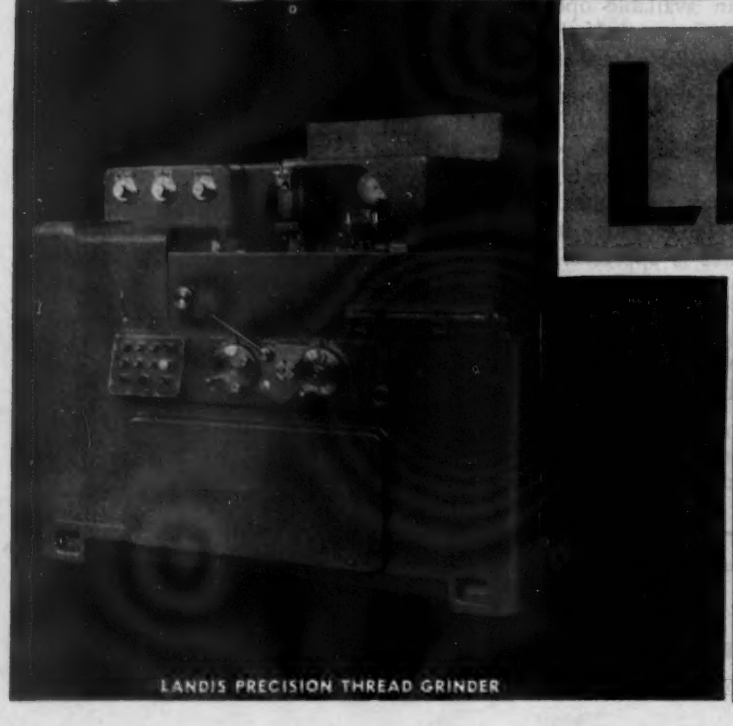
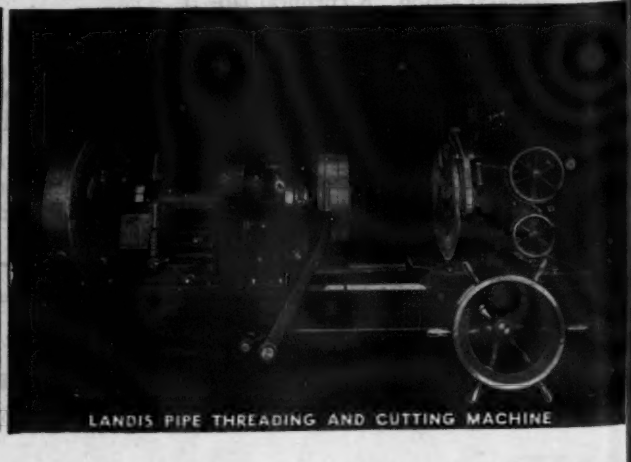


LANDIS PRECISION THREAD GRINDER



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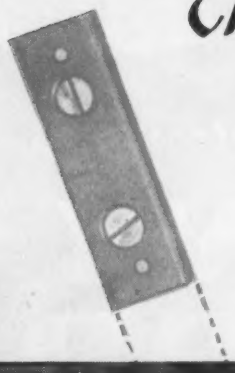
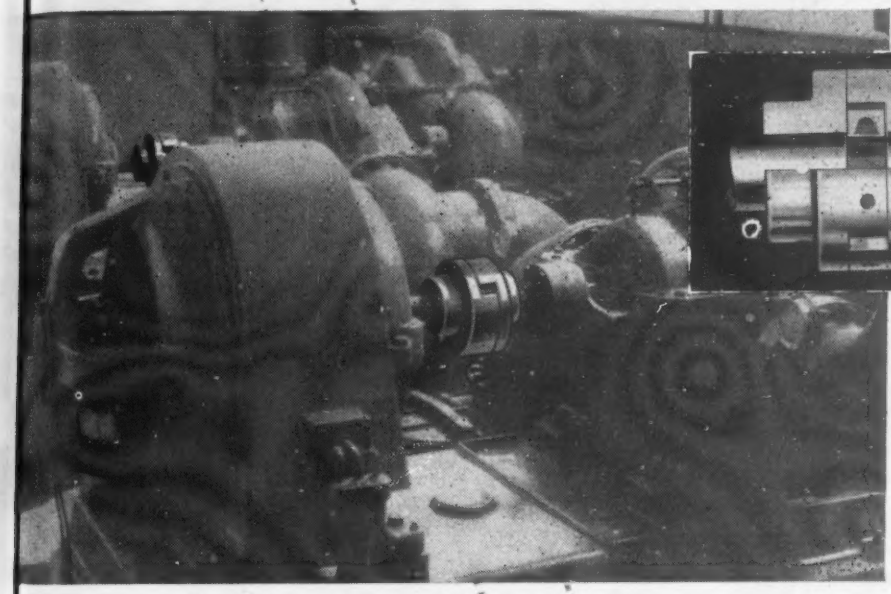


ONLY AMERICAN FLEXIBLE COUPLINGS have two identical jaw flanges connected by one square floating center member. Three sturdy parts of the correct materials for each of the three applications - for average mechanical power applications - for medium torque transmitting applications - for most severe mechanical power applications.

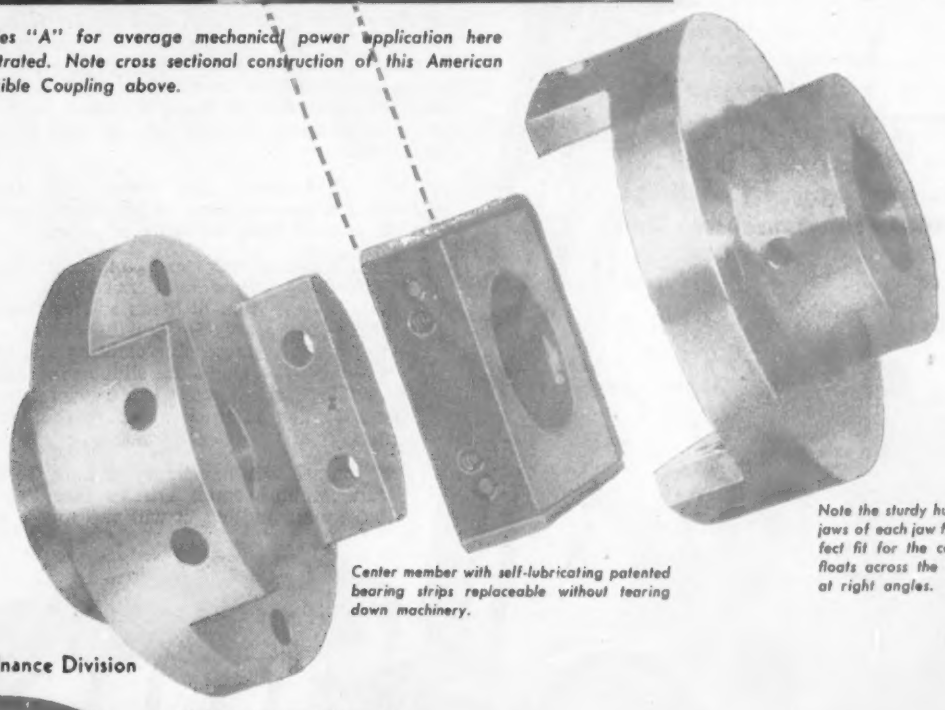
Illustrated here is the unique feature of the square floating center member . . . A centrifugal lubrication unit of high strength alloy metals. This replaceable self-lubricating bearing strip on each of the four sides of the center member assures long life to the coupling . . . Can be replaced without tearing down the unit or disturbing connected machines.



In this particular application illustrated, the jaw flanges are high strength alloy iron, and the center member is high strength alloy iron as well. This is the Series "A" for the average mechanical power application.

Write for new bulletin giving full details and specifications on this and the medium and heavy power applications of American Flexible Couplings . . . the only 3 part flexible couplings.

Series "A" for average mechanical power application here illustrated. Note cross sectional construction of this American Flexible Coupling above.



Center member with self-lubricating patented bearing strips replaceable without tearing down machinery.

Note the sturdy hubs and the machined jaws of each jaw flange offering a perfect fit for the center member which floats across the face of each flange at right angles.

Note the two parallel jaws of the jaw flanges which hold the center member.

Ordnance Division

ZURN

AMERICAN FLEXIBLE COUPLING CO.
DIVISION OF
J. A. ZURN MFG. CO., ERIE, PENNA.

Bring your problems to the Pioneers of

HEAVY LOAD MATERIALS HANDLING

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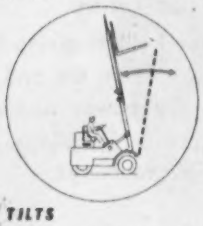


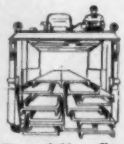
TILTS

TRAVELS—SIMULTANEOUSLY

Ross engineers have pioneered and developed Materials Handling Equipment (*mounted on pneumatic tires*) having capacities far above conventional equipment.

Loads As High as 7 Tons are handled with ease with *Ross* Fork Trucks and held rigidly from the time they are lifted. You can unload materials, move them swiftly wherever a truck will go, stack them in storage or deliver them to crane or production line; load and deliver heavy finished products to shipping platform; or load into cars, or trucks, or airplanes.

Ross High Capacity also makes big savings in eliminating manhandling of materials in bundles, bales, or skid bins, on skids or pallets.



Loads are underslung in Ross Straddle Carriers. This combination of loads and carrier considerably lowers the center of gravity, increasing stability and safety. The load can't slide or roll off, and *Ross* Straddle Carriers move loads several hundred feet or 20 miles at truck speed. (*Mounted on pneumatic tires.*)

If you are handling heavy or bulky loads, or if you can combine small articles into "packages" and save manhandling, it will pay you to write Ross.

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without more weight

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Alloy steels are the strongest of metals. Their exceptionally high strength-to-weight ratio assures the most efficient combination of these two properties.

But there are other good reasons for your use of alloy steels. They can be hardened uniformly and accurately to the greatest extremes of any material—hence are highly resistant to abrasion. They insure against non-hardened or soft spots in wearing surfaces.

Alloy steels also provide super-toughness to resist sudden shock, strain or reversal of stress. They resist fatigue, high temperatures, sub-zero cold and corrosion. They are the most dependable and the hardest working steels that money can buy.

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When used for locomotive side rods such as this, Republic Alloy Steels insure highest strength for the weight involved—and provide uniform hardenability that produces wear-resistant surfaces.

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LIME Arcaloy stainless electrodes with extruded LIME coating are especially designed for all-position welding with reverse (electrode positive) polarity, DC current. Welds of correct contour are easily made in vertical and overhead positions.

Coating color—Green

TITANIA Arcaloy stainless electrodes with extruded TITANIA coating are primarily designed for flat, down-hand welding with reverse (electrode positive) polarity, DC current. This type of coating produces an extremely smooth bead which tapers off on each side to a feather edge.

Coating color—White

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Coating color—Brown

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Here are three types of stainless electrode coatings—LIME, TITANIA and AC-DC. They're all good. Which is best?

Alloy Rods Company manufactures all three types and their quality and efficiency have been established. A careful analysis of the job and the conditions under which the electrode must operate will determine the type of coating to be used. It will pay you to consult us for advice on your particular stainless electrode needs.

Here's the new Alloy Rods Company stainless electrode catalog with complete information of all types of coating, physical and chemical properties and welding procedures. Write for your copy today.

Alloy Rods Co.

YORK, PA

How Nelson *Automatic* Stud Welding saves time and material—

Here is a complete fusion weld that is obtained in less than ½ second! Yet the resulting stud weld is stronger than the strength of the stud. By this welding method precision work is obtained economically and close tolerances are held.

Below is a typical example of how Nelson Stud Welding is helping one manufacturer save time and material. Consistent results like this, *automatically* produced, can be obtained wherever studs can be end-welded to metal surfaces.

The equipment for Nelson Stud Welding is handy to use and completely portable — or may be obtained as a single or multi-gun precision jig for close tolerance production of stud welded parts. It is easily operated by men or women, and no previous welding experience is necessary. Workers are securing 1000 or more studs in eight hours without difficulty.

HOW TO DO IT—

Problem:

SECURING STUDS TO HOLD INTAKE VENT COVERS ON INDUSTRIAL FURNACE.

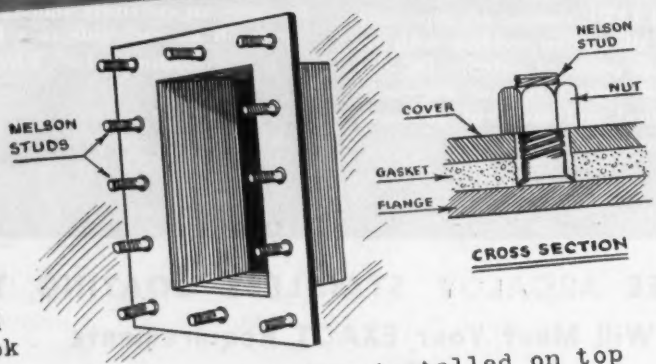
Former Method--Drill hole through flange, tap hole, insert bolt, and hand-weld head of bolt. Process took too long.

Present Method--Saves more than 40% of the time of former method. Studs are quickly secured with equal strength and accuracy.

After layout and center-punching the studs are welded to the flange. Gasket and sheet metal cover are then installed on top and secured with nuts.

Portable Nelson "gun" well liked because stud welding can be done on furnace while assembling.

Do you have a problem like this stud welding can solve?



FOR DETAILS AND CATALOG WRITE:

NELSON SPECIALTY WELDING EQUIPMENT CORPORATION

Dept. T, 440 Peralta Avenue
San Leandro, California

EASTERN REPRESENTATIVE: Camden Stud Welding Corp., 1416 South Sixth Street, Camden, New Jersey

Any chef will tell you he can mix and boil, and stir and season, but he can't get the best from his recipe unless he combines his experience and skill and knowledge with the ingredients he so carefully chooses. And it's that way in our own business, too! We season your specifications with our own long helpful experience, we mix common sense with an understanding of your problem, we make use of the basic ingredients of willingness and "know-how" to produce a better job faster! Indeed, there isn't any shortage of *service* on the daily Levinson menu!

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The LEVINSON STEEL CO.

PITTSBURGH, PA.

L S-2

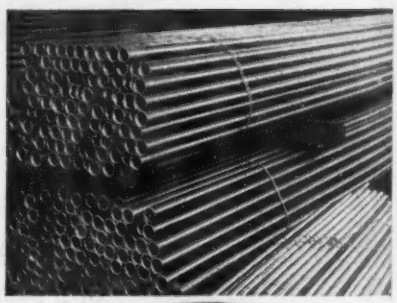
The better the alloy STEEL...

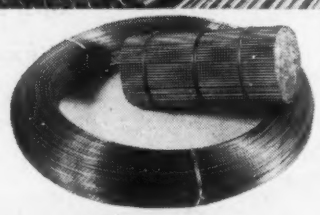
...the better the PRODUCT!

It makes sense . . . a steel product is no better than the steel from which it is made. And, when the use of *alloy* steel is indicated, the advantages of *Pittsburgh Alloy Steel* . . . made by the *open-hearth* process . . . should be considered.

In the past 2½ years Pittsburgh Steel Company has combined long mastery of open-hearth steel making with alloying know-how to produce more than *two hundred thousand tons* of open-hearth alloy steel . . . every ton of which had to meet the severe requirements of war time use. Qualified to pass rigid aircraft inspection specifications, when necessary, *Pittsburgh Alloy* Steel billets, bars, wire and tubing are equal in every respect to comparable grades made by other processes.

When *your* requirements for alloy grades combine the need for better quality steel with economies resulting from experience in the production of large tonnages, *Pittsburgh* Alloy Steels present definite advantages. Write for full technical information or send your specs for analysis and recommendation.





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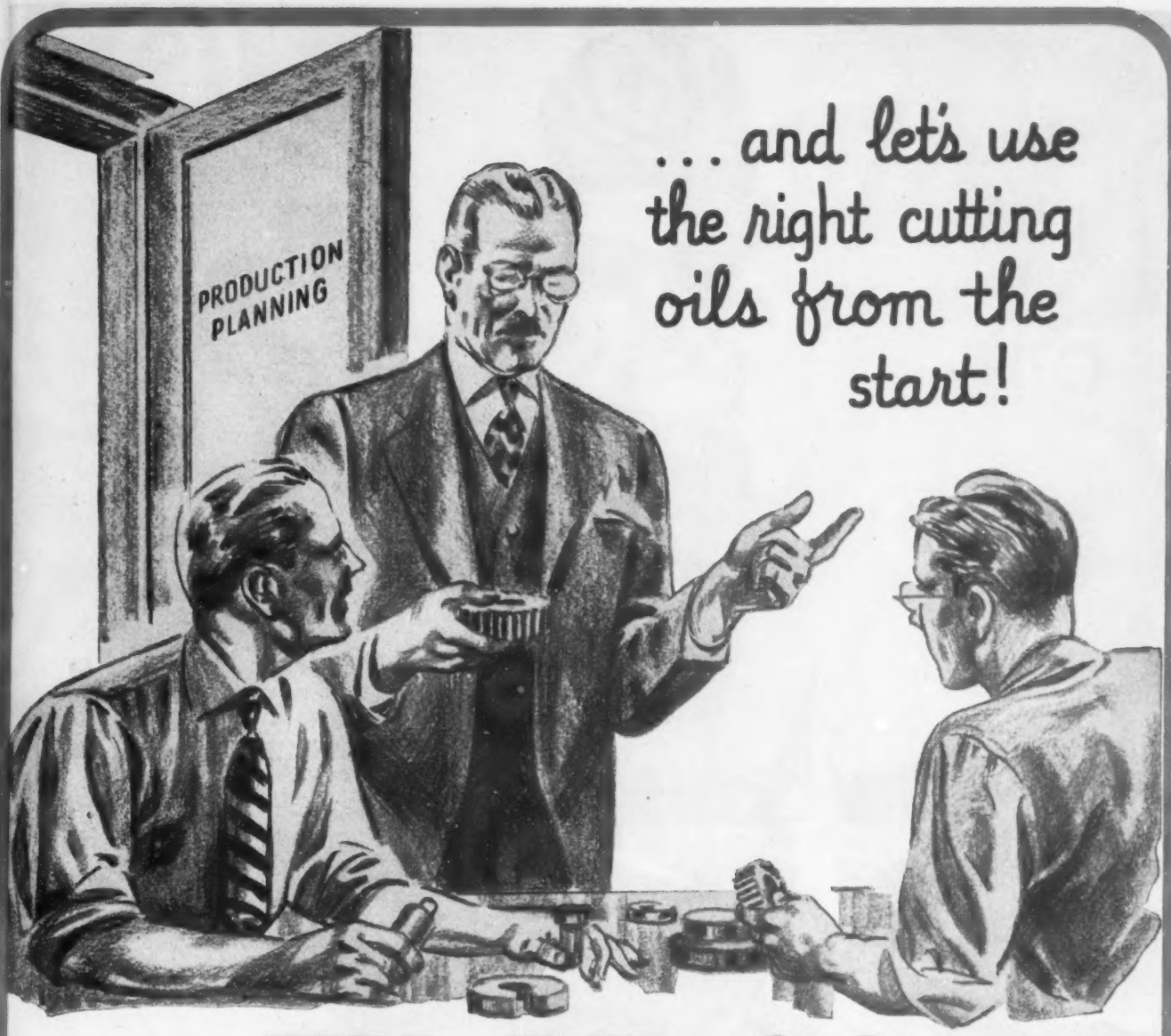

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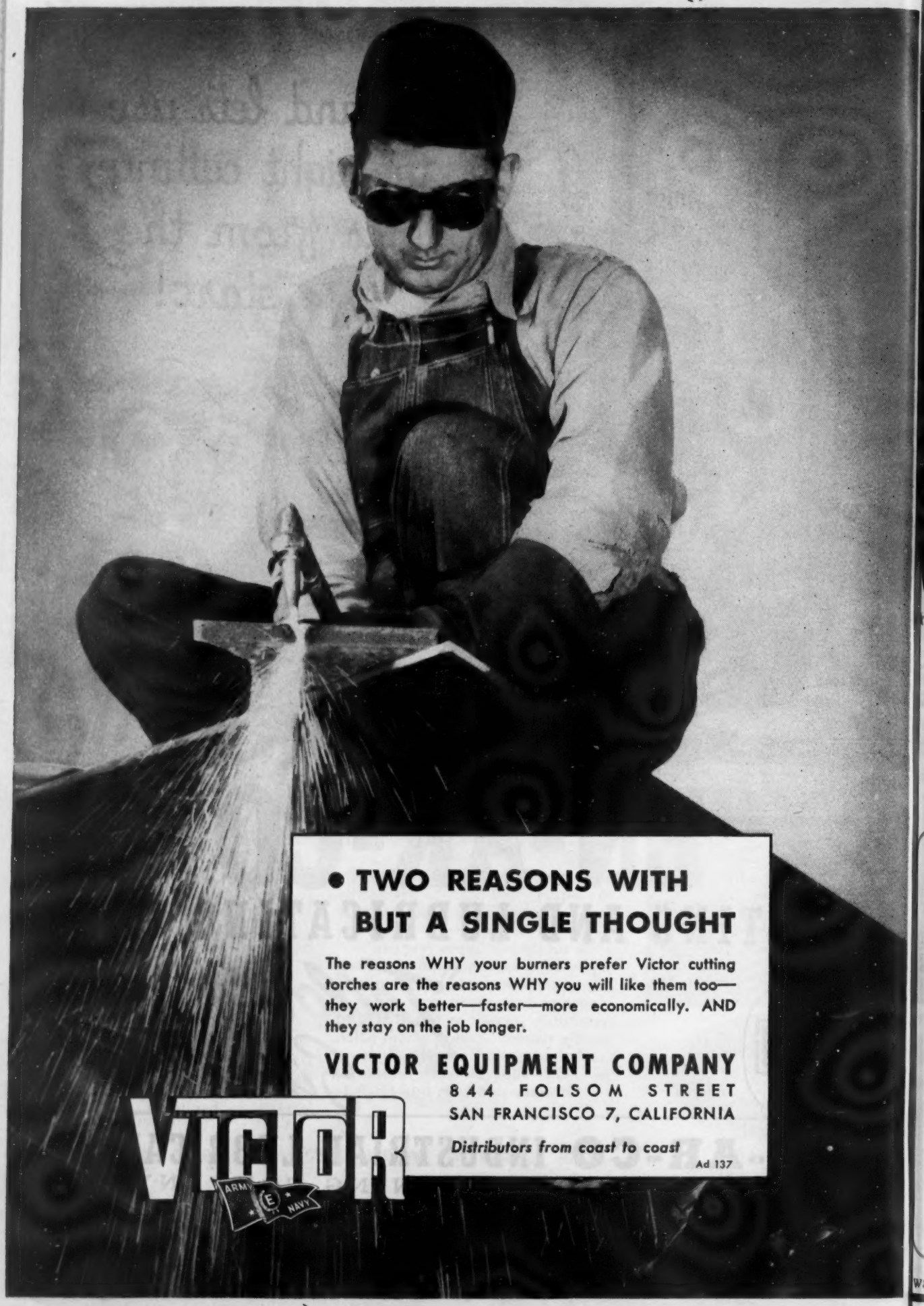
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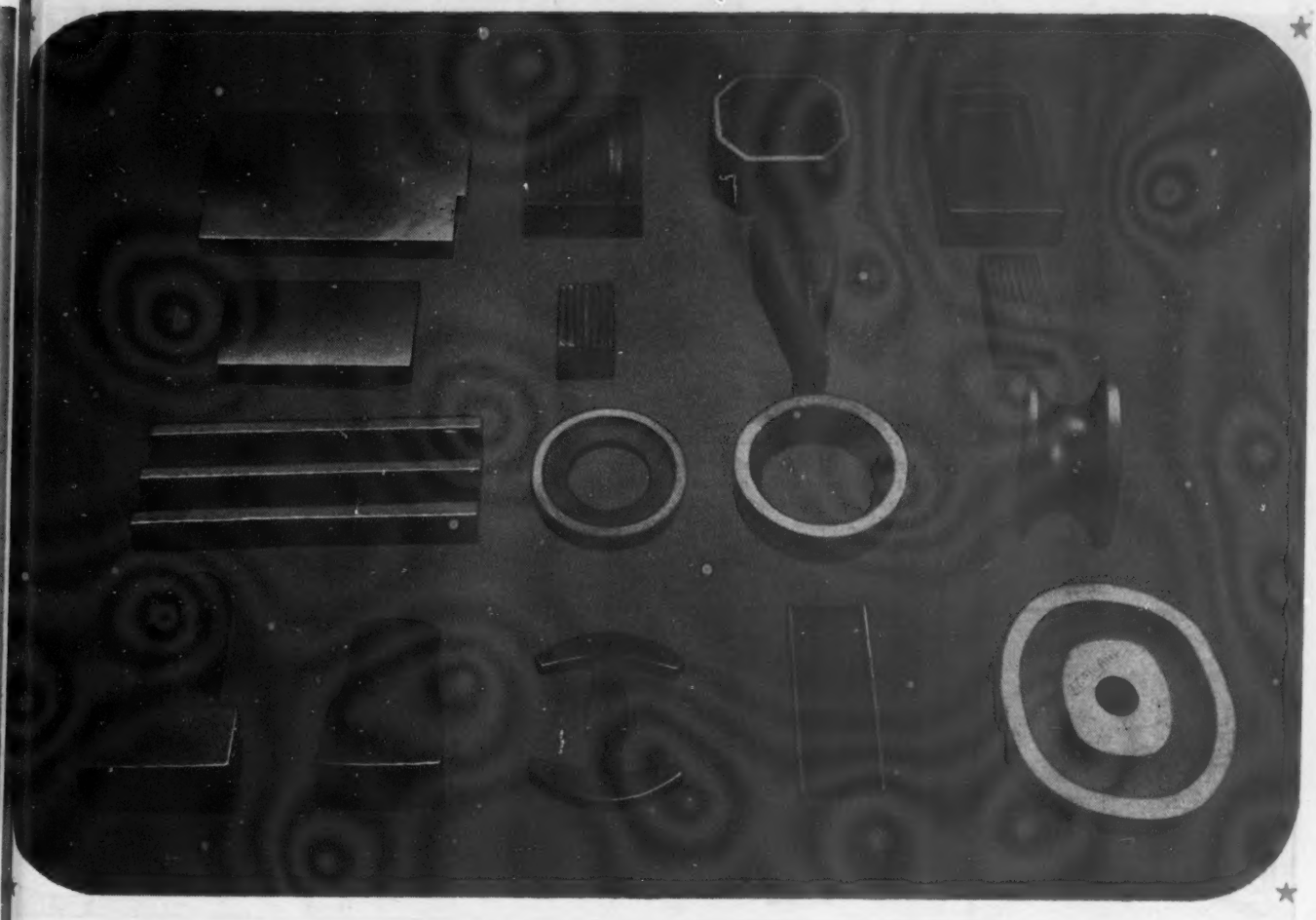

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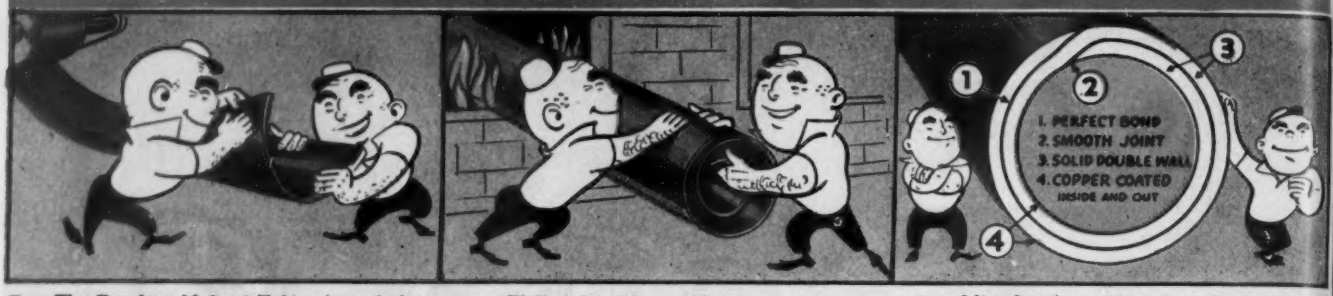
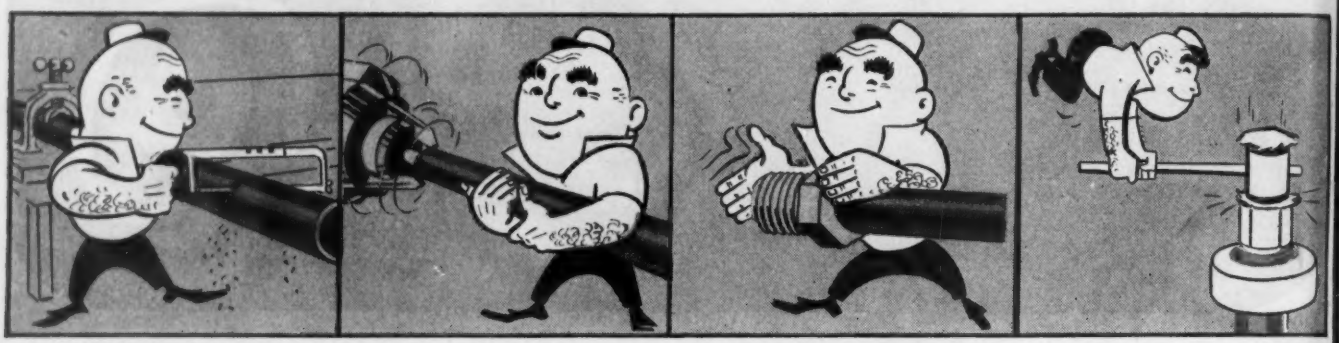
FABRICATING A TYPICAL
BUNDYWELD LIFE LINE



1 The Bundyweld Steel Tubing is made by a process entirely different from that used in the making of any other tubing. A single strip of copper-coated S.A.E. 1010 steel is continuously rolled twice around laterally into tubular form.

2 Walls of uniform thickness and concentricity are assured by the use of close tolerance cold rolled strip. This double rolled strip is next passed through a brazing furnace where the copper coating fuses and alloys with the double steel walls.

3 After brazing and cooling, the tubing has become a perfectly bonded SOLID double wall steel tube, completely copper brazed throughout 360° of wall contact, copper coated inside and out, free from scale and closely held to dimensions.

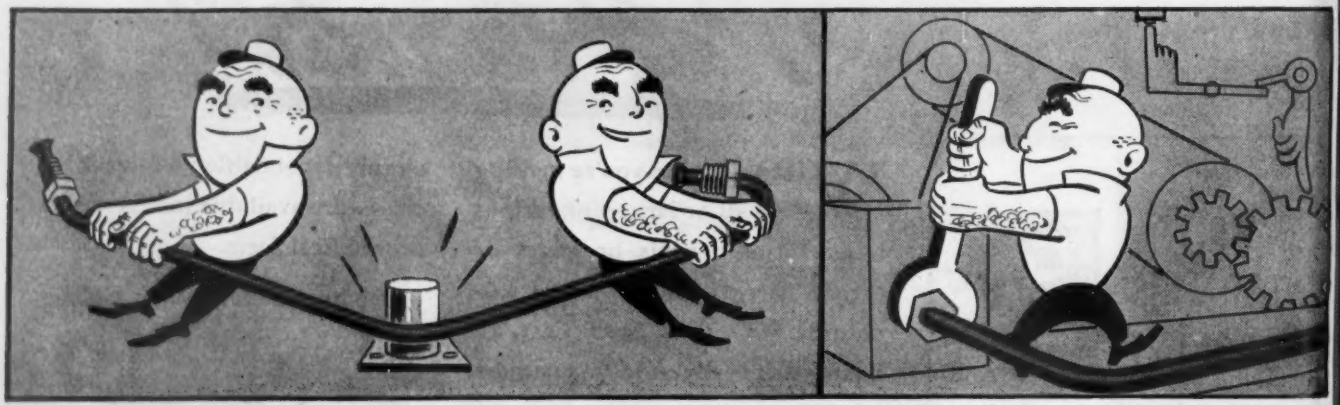


4 The next step in fabrication of a Bundyweld part is cutting to length, which is done at the Bundy plant on a circular saw, or, in the field, with any tube cutter which may be available.

5 The ends of the tube are burred with a specially designed tool with cutting edges of high speed steel which removes both inside and outside burrs in one operation.

6 Next, fittings are assembled. Any of the standard flare, compression type or soldered fittings may be used. Where flare type fittings are used, the Bundy Double Flare is recommended.

7 The Bundy Double Flare, which has been adopted as a standard by the S. A. E., safely permits frequent removal and replacement of fittings, as well as over-torqueing.



8 The last operation in fabrication is bending to shape. Last and most important . . .

9 The Bundyweld part is installed on *your* product.

Bundyweld Steel Tubing is furnished hard or annealed in standard diameters and gauges up to 5/8" O. D. Special sizes cold drawn as desired.

Bundyweld is also furnished in Monel. For complete information, contact our nearest representative or write Bundy Tubing Co., Detroit 13.

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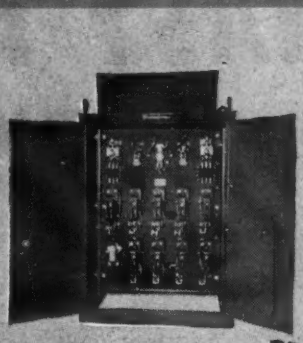
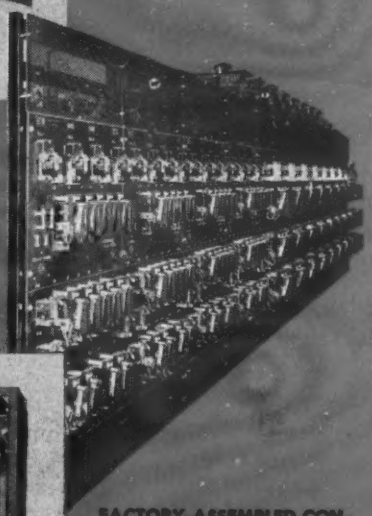
For any D-C Control

A MOTOR STARTER OR COMPLETE MILL CONTROL

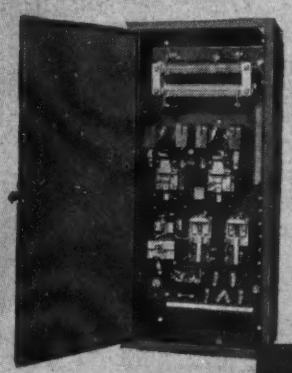
Check Westinghouse



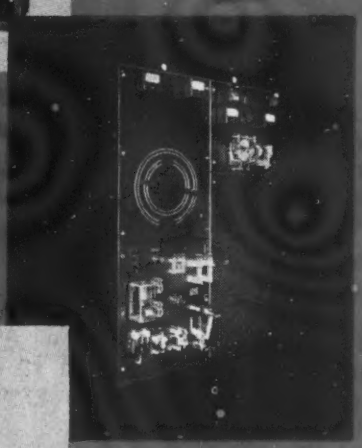
CONTROL for constant-voltage planer drives . . . or other reciprocating machinery, shown at the left.



HEAVY-DUTY CONTROL of magnetic type for constant or adjustable speed motors used in machine tools or other operations requiring inching or jogging, below.



FACTORY-ASSEMBLED CONTROLLERS for steel mill auxiliary service, above.



CONTROL PANEL used with Rototrol for single-motor paper machine drives, right.

DEAD-FRONT TYPE CONTROL PANEL for operation of constant-voltage dynamometers, shown at left.

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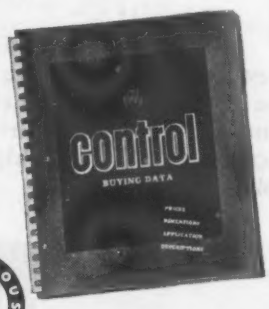

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A new system has just been developed by "CARBORUNDUM" to help you save time and assure you of easier product identification. Here's how it works:

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Coated Abrasive Products produced for you by "CARBORUNDUM" have been given names that indicate their use in *your* plant. For instance, in the woodworking industry products you use will be identified as "Drum Paper," "Cabinet Paper," "Finishing Paper," "Belt Paper," etc. . . . or, if your business is in the metal-working field, "Industrial Cloth" and "Metal Cloth" would be the products you require.

The new names are simple. They describe the product you need. And they are easily remembered by your plant personnel.

2—SPECIFICATIONS ARE PLAINLY LISTED

To assist you further in specifying the correct product, the specifications are plainly marked. They are: Grit Size; Backing; Type of Abrasive; Type of Coating; and Finish. You can locate them on both the *labels* and the *backing materials* of all Coated Abrasive Products by "CARBORUNDUM" . . . in your stock room—or your production line—quickly and easily. The specifications are always in the same sequence.

3—COLORFUL LABELS PROVIDE QUICK IDENTIFICATION

New labels have been designed for the entire line to give prominent display to product names and specifications. Printed in bright red and black, they are quickly located in your stock room. The information you need is reproduced in large, bold, easy-to-read letters.

THERE IS A PRODUCT BY

CARBORUNDUM

TRADE MARK

FOR EVERY ABRASIVE APPLICATION

"CARBORUNDUM" is a registered trade mark of and indicates manufacture by The Carborundum Company)

...ORDER COATED ABRASIVES

...IS NEW MARKING SYSTEM

SEND FOR THIS NEW BOOK

It provides important information about Coated Abrasive Products and their uses. Features included are:

1. Sanding and Finishing Processes.
2. Abrasive Grains.
3. Classification of Grain Sizes.
4. Bonding Materials.
5. Coatings.
6. Backing Materials.
7. Flexing.
8. Suggestions for stocking.
9. How to identify and specify Coated Abrasive Products by "CARBORUNDUM."
10. Recommendations for Belt Splices.
11. Machine specifications for Belt Sanding.
12. Specifications for Standard Coated Abrasive Products.

IT'S FREE—MAIL THE COUPON NOW!

This new book "Sanding and Finishing" will be issued free to all bona fide manufacturing plants using Coated Abrasive Products in production operations.

Act now. Write today for your copy . . . or fill in the coupon and attach it to your company letterhead.

The Carborundum Company
Niagara Falls, N. Y.

Please send me my free copy of "SANDING AND FINISHING"

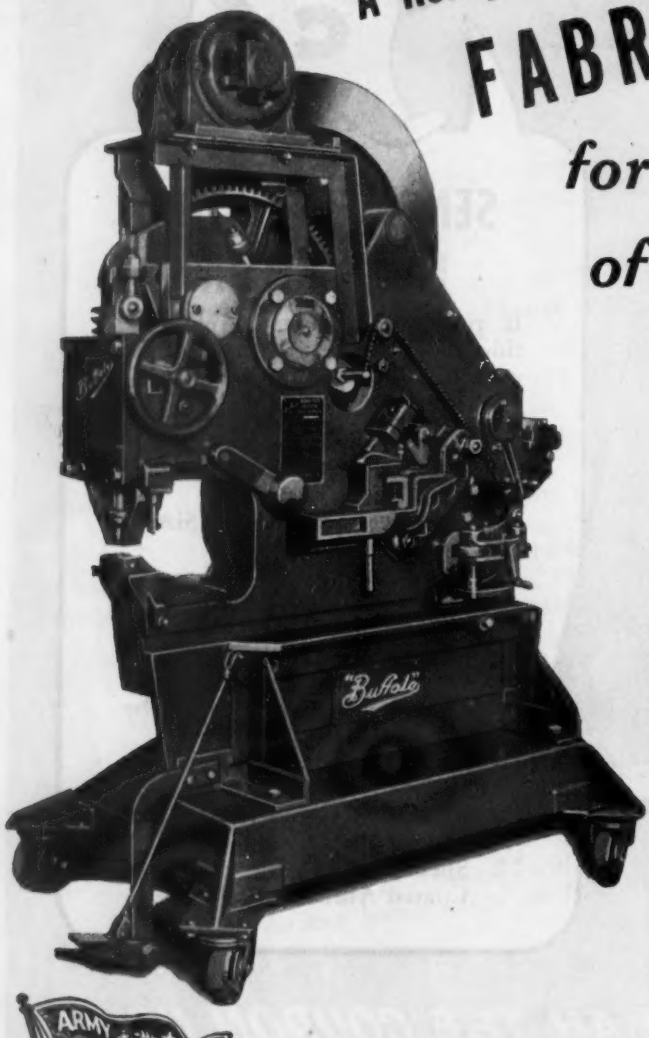
Name.....

Firm.....Title.....

Address.....

Industrial STRONG ARM

A Heavy-Duty, Swift, Versatile FABRICATOR



for PUNCHING • SHEARING • SLITTING
COPING • NOTCHING

of ANGLES • TEES • CHANNELS • I-BEAMS
ROUNDS • SQUARES • FLATS • PLATES

that's the "Buffalo"

UNIVERSAL IRON WORKER

When it comes to rapid-fire turn-out of the above (and many other) fabrication operations, there's nothing like a husky, accurate, dependable "Buffalo" Universal Iron Worker! Even an inexperienced operator manning this "Buffalo" strong arm can keep your production *moving* right up to schedule with no "bottle-necks" or lags in his department's output . . . besides cutting your production costs.

And "Buffalo" Universal Iron Workers stand up under the heaviest 24-hour usage, too. Designed and built under highest standards of Buffalo workmanship and materials, every detail is made to give long, trouble-free SERVICE. For further details, write:

ARMY E NAVY

BUFFALO FORGE COMPANY

158 MORTIMER ST. BUFFALO, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo"

UNIVERSAL IRON WORKER

900 CAPACITORS AN HOUR *Soldered by ONE Electronic Heater*

↑ Located beneath the feed belt, an induction coil connected to a 5-kw G-E electronic heater solders these capacitor cases in a continuous operation.

→ Capacitor case prepared for soldering. Note wire solder encircling case at seam.

A CHANGE from the old method of soldering to a continuous operation employing electronic heat more than doubled the output, per operator, of capacitor units at our Pittsfield, Mass., plant.

To perform this production-line operation, the containers are assembled, and fluxed and wrapped with wire solder at the seams. The work, in inverted position, is then belt-conveyed over an inductor coil connected to a 5-kw G-E electronic heater. The magnetic field is such that uniform heating is obtained and small units of circular, oval, and even rectangular shapes can be uniformly soldered at constant speed. In a production-line operation, this flexibility allows a variety of work to be handled with a standard setup, and is an important factor in speeding up output.

Whether *your* production problems involve the brazing or soldering of a simple or complex assembly, or the application of heat to a limited zone—find out, now, how G-E industrial heating equipment can improve your products in quality and increase your output. For details, get in touch with the G-E industrial-heating specialist in our nearest principal city, or write General Electric Company, Schenectady 5, N. Y.

No. 12 in a series of case studies on the accomplishments of G-E electronic heaters.

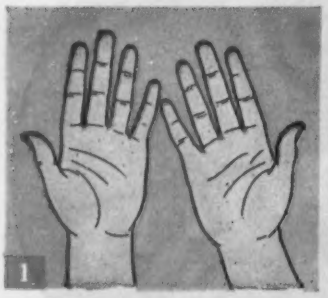
A G-E 5-kw electronic heater of the type employed for the continuous soldering of capacitor cases.

ELECTRONIC HEATERS

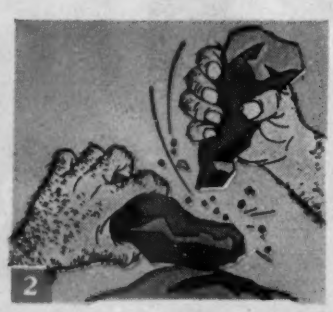
Buy all the BONDS you can—*and keep all you buy*

GENERAL ELECTRIC

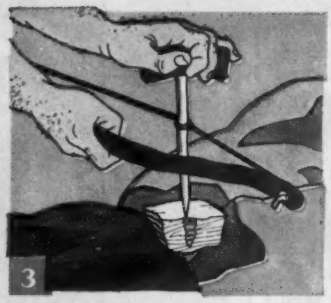
It started with the other hand



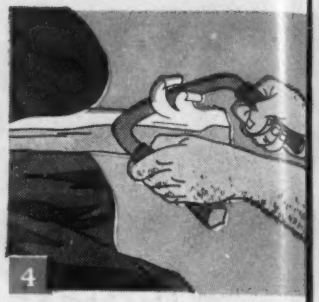
Right or left-handed, your *other* hand is a type of jig.



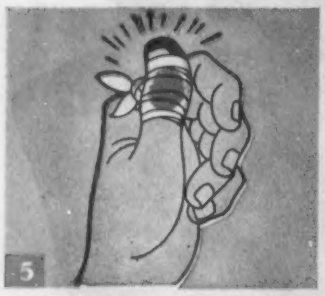
A jig is something to hold work while you're working on it.



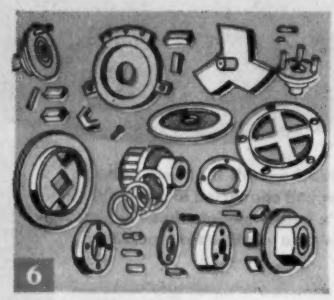
Notches in stones or logs left both hands free.



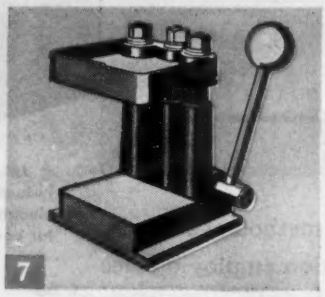
Two heavy stones once serve as a sort of vise or jig.



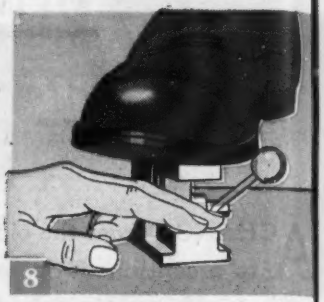
Modern adjustable jigs have two faults. Some slip, hurt people.



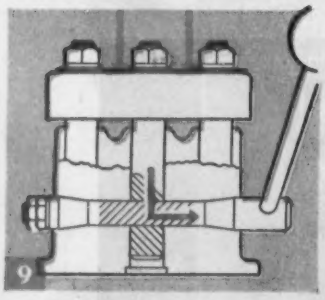
Locking mechanisms of others wear out fast or fail.



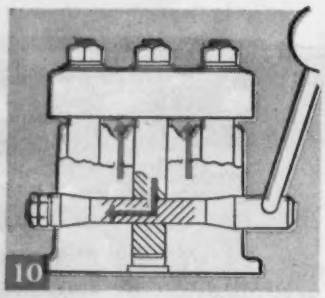
These problems were solved by Woodworth's CONE-LOK JIG.



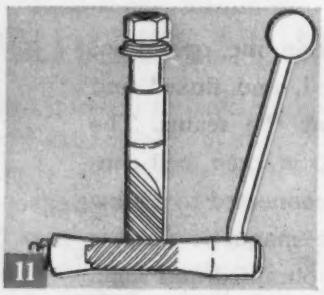
This amazing jig locks instantly. Can't slip. Protects workers.



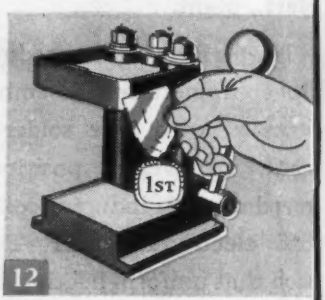
Force on top travels thru 45° gear to right. Left cone locks.



Force from below is transmitted to left . . . locks cone at right.



CONE-LOK JIG is simple. Three moving parts do the job.



CONE-LOK is praised by production men everywhere.

What Woodworth products mean to industry

THE contribution to mass production efficiency made by the CONE-LOK JIG is typical of all Woodworth products.

There is a reason for this.

Every Woodworth product must conform to the basic policy of this company . . . *to make only products which will benefit industry through increased production and reduced costs.*

This means that the great demand for Woodworth Tools and Gages will be continuing, especially in view of the coming battle for postwar markets.

And it means that Woodworth engineers have been charged with the responsibility of searching constantly for new ways to speed up and lower the cost of production, in connection with Woodworth products of the future.

The constant growth and expansion of the N. A. Woodworth Company is due to strict adherence to these objectives.

ACCURACY YOU W CAN TRUST

WOODWORTH

N. A. WOODWORTH CO., SALES DIVISION, 1300 E. NINE MILE ROAD, DETROIT 20, MICHIGAN

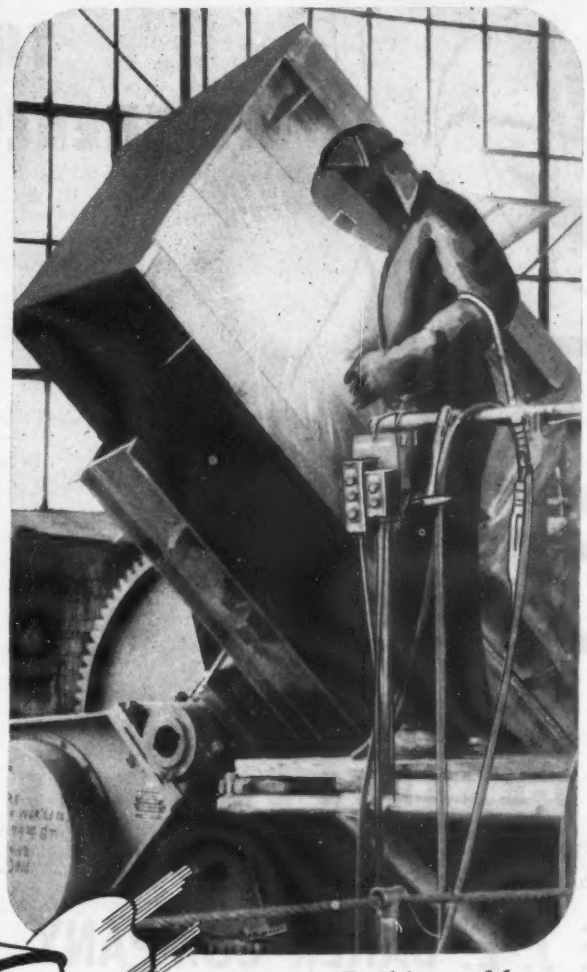
PRECISION GAGES

PRECISION MACHINED PARTS

PRECISION TOOLS

Greater Strength!
Less Weight!

VAN DORN *welded* MACHINE BASES



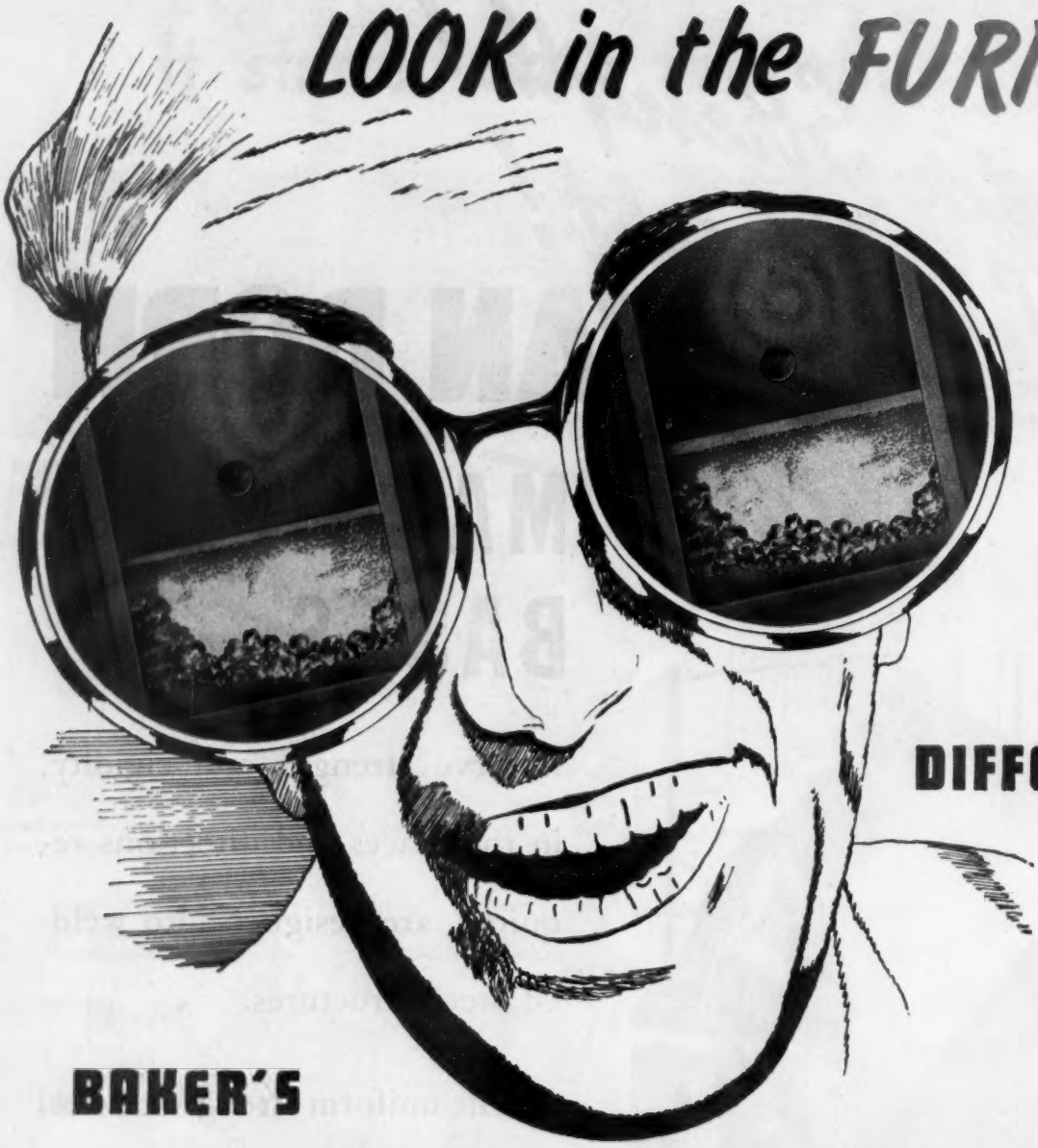
Reserve strength and rigidity, in the places and directions required, are designed into welded steel structures.

...The uniform strength of steel shapes and their adaptability in fabrication eliminates the need for adding weight merely as a safety factor or to accommodate production processes.

Builders of better iron and steel products for 75 years.

THE VAN DORN IRON WORKS CO.
2685 EAST 79TH STREET CLEVELAND 4, OHIO

LOOK in the FURNACE



AND WATCH THE DIFFERENCE!

BAKER'S

MAGDOLITE

THE *Original*

DEAD-BURNED DOLOMITE

When you order, specify Baker's Magdolite . . it pays!

5 WAYS BETTER
COMPOSITION
QUALITY
STRENGTH
PREPARATION
ECONOMY

THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA

BILLMEYER, PA. MILLERSVILLE, OHIO

MAGDOLITE • LOW SILICA LIMESTONE
CHEMICAL LIME • FLUXING LIME

SERVING THE STEEL INDUSTRY FOR 35 YEARS

DON'T take our word for the fact that the rugged construction of Crescent Electric Trucks results in almost unbelievably low replacement parts costs. Here is an actual case that proves Crescent's economy with facts and figures.

The _____* Sugar Refinery operates 46 Crescent Electric Industrial Trucks—

14 of them are over 23 years old
8 of them are over 22 years old
12 of them are over 21 years old
12 of them are over 13 years old

The average age of these trucks is 19.7 years.

The average cost of repair parts for the last seven years — after these trucks had already been in service for an average of over 12 years — is *only $39.99 per truck.*

Operation and maintenance cost of Crescent Electric Trucks also is extremely low. Follow the lead of leading industries—Crescentize your plant and cut your materials handling costs.

**Name on request*

FREE CATALOG pictures and describes all Crescent models now being manufactured. It will help you to choose the right Crescent for your materials handling. Send for a copy today!

CRESCENT TRUCK COMPANY
1110 Willow St., Lebanon, Pa.

Representatives throughout the United States—consult your classified telephone directory.

Crescent ELECTRIC TRUCKS AND TRACTORS

Industrial Truck and Tractor Specialists Since 1917

TYPE W-56

Only **TYPE W-56** *offers ALL these features*

Welds have excellent surface and profile appearance

●

Deep-penetrating, spray-type arc

●

Welds in all positions

●

A-c or d-c operation

SPECIFICALLY designed for welding carbon-molybdenum steels, in all positions, this new G-E electrode can also be used successfully on other low-alloy, high-tensile materials. W-56 is the *first* electrode to meet all of the requirements of AWS Classification E7010/E7011. And it is the first to permit the use of *either* a-c or d-c for all of these applications. Even more important, the recognized advantages of the a-c welding process are now made available to industry for high quality welding of low-alloy, high-tensile steels in the vertical and overhead positions.

Type W-56 Welds Exceed Specifications

Heavily covered, Type W-56, provides a steady, spray-type, deep-penetrating arc which produces a weld of superior quality and excellent appearance. Its light, friable slag is readily removable and sets up rapidly, facilitating welding in the vertical and overhead positions.

Although Type W-56 is designed for use in all positions, its superior welding qualities are most noticeable when it is used in the vertical. The bead obtained is relatively flat, with smooth uniform ripples. X-rays of plates welded in the vertical position are exceptionally clean, and the mechanical properties of specimens are well above specification requirements.

Test Type W-56 Yourself

If your welding work includes the fabrication of pressure vessels (fittings), pressure piping or other applications involving the welding of low-alloy, high-tensile steel try the new Type W-56 electrode. Ask your G-E arc welding distributor for samples and see for yourself the increased welding production and superior welds obtainable with this newly-developed rod. Your distributor can also provide you with detailed performance data. Or, write General Electric Company, Schenectady 5, N. Y.

GENERAL ELECTRIC

673-67-8748

THE FIRST E7010/E7011 ELECTRODE FOR WELDING LOW-ALLOY, HIGH-TENSILE STEELS

This single-pass fillet made in the vertical position illustrates the deep penetration and excellent fusion obtained with Type W-56.

Of carbon-moly steel, this transverse radiator assembly being welded in the vertical position is typical of the applications for which Type W-56 was designed. Either a-c, as in the illustration, or reverse polarity d-c can be used.

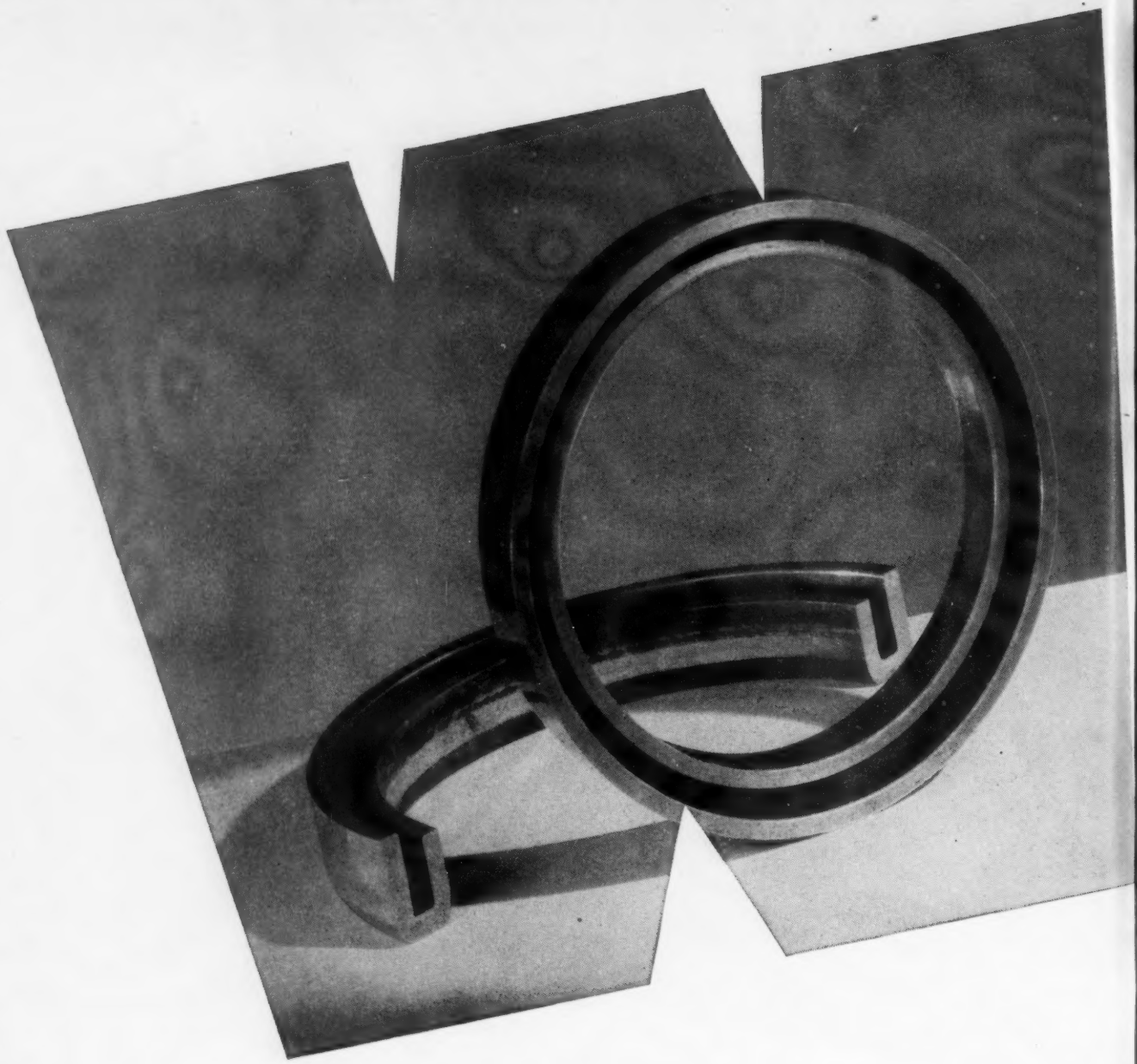
RANGE OF MECHANICAL PROPERTIES

(Stress Relieved)

	Alternating Current		D-c Reverse Polarity	
1/8-in. Diameter				
Tensile	76,000	78,000	73,000	73,000
Yield	60,000	62,000	56,000	58,000
Elong. % 2 in.	26.0	28.0	27.0	28.0
Reduction %	67.0	73.4	62.5	71.4
5/32-in. Diameter				
Tensile	70,700	72,500	73,000	71,000
Yield	54,500	57,500	59,500	57,500
Elong. % 2 in.	28.0	29.0	26.0	25.0
Reduction %	69.0	67.0	67.0	64.5
3/16-in. Diameter				
Tensile	75,500	76,500	72,000	73,500
Yield	61,200	62,500	58,000	57,000
Elong. % 2 in.	32.0	30.0	28.0	29.0
Reduction %	68.0	67.0	64.5	67.0

ARC WELDING ELECTRODES AND EQUIPMENT

Buy all the BONDS you can —and keep all you buy



Someone Said, "That's a Stamping Job for Presteel"

These oil seal retainers might have been hogged out of cast iron, but stamping would save weight, and reduce machining. As blow holes or porosity would scrap the pieces, the job was a natural for rolled material, but a source had to be found to make the parts so that one would slide into the slot of another. Tolerance was .003" on the slot; no more than .006" at any point, including concentricity. Devising tools to stand up in the narrow slot was a problem, but Presteel knew how to solve it. First the inside was drawn; then the outside, the latter in two operations to relieve pressure on the tools. Finally the two sides were ironed to meet tolerances. The cost? One-third less than that of machining!

Whenever you have a stamping problem, put it up to Presteel. If it can be stamped, your best bet is Presteel. Our engineering staff is always ready to help you.

WORCESTER PRESSED STEEL CO.

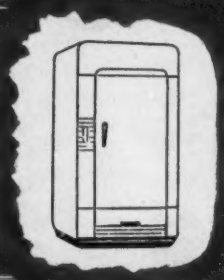
508 Barber Avenue — Worcester 6, Mass.

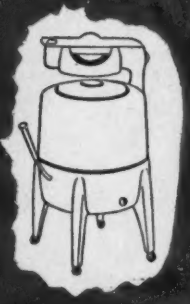
ALLOY STEELS AND OTHER METALS COLD FASHIONED SINCE 1883

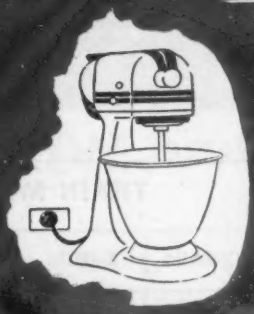
Representatives in Alexandria, Virginia, Buffalo, Canton, Ohio, Chicago, Denver, Detroit, Fort Worth, Indianapolis, Los Angeles, New York, Philadelphia, Syracuse, Toronto

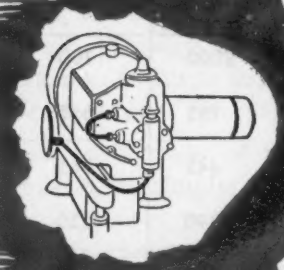
A DESPATCH FINISHING SYSTEM!

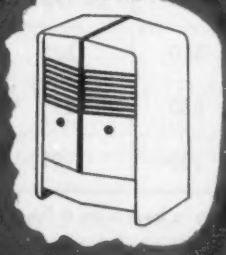
...to give your products maximum "eye-appeal"











FOR that all-important first appeal to new customers, nothing clicks faster than a durable, eye-catching finish on your product—properly applied. And that's why it will pay you to have DESPATCH Engineers supply your finishing system. This assures you of up-to-the-minute equipment, smoothly coordinated to do the job right.

This experienced Despatch Engineering Service (backed by 43 years specialization in finishing system equipment) frees you of bothersome details . . . saves time . . . helps reduce installation and finishing costs.

And it will help you get your product to the market sooner, with the kind of finish that wins and holds customers.

Despatch Engineers will assume full responsibility for supplying your *complete* finishing system, or such individual equipment items as:

1. FINISH BAKING OVENS of all types, with heating systems adapted to your specific needs.

2. SPRA-BONDERIZING UNITS, multiple stage types, with cleaning, rinsing and Spra-Bonderite sections.

3. DRYERS for various operations.

4. AIR CONDITIONERS of improved design for assuring clean, filtered air in your spray booths.

5. CONVEYORS of all sizes and types to speed handling and reduce finishing costs.

6. SPRAY BOOTHS of approved design; types and sizes to suit your needs.

Send this coupon for details!

DESPATCH OVEN COMPANY
619 SE 8th Street, Minneapolis 14, Minn.

We are interested in the following. Please send additional information:

☐ BAKING OVENS ☐ BONDERIZING UNITS
☐ DRYERS ☐ AIR CONDITIONERS
☐ CONVEYORS ☐ SPRAY BOOTHS

☐ Without obligation, please survey our plant and recommend suitable Finishing Dept. equipment.

NAME_____ TITLE_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

DESPATCH
OVEN COMPANY MINNEAPOLIS 14 MINNESOTA, U.S.A.

Whitcomb
LOCOMOTIVES

Blue Ribbon Performers at Low Cos

Down goes your haulage cost when this 50 ton Diesel Electric is in operation, switching and spotting cars. This model is ruggedly built — simplified controls offer ease of operation—maintenance costs are exceptionally low. Its average diesel fuel consumption is three gallons per hour, and the annual net savings are often 20 to 30% of its net cost. Diesel Electrics pay for themselves in a few years time through savings effected on fuel, labor, water, track maintenance, and availability.

	TRAIN MOVEMENT			
	1/2-Mile	1-Mile	3-Miles	Continuous
Level tangent track	2680	2400	2000	1700
1/2 % Grade	1100	955	755	635
1 % Grade	660	570	445	365
1-1/2 % Grade	460	395	310	250
2 % Grade	350	300	230	180
2-1/2 % Grade	280	235	180	140
3 % Grade	230	195	145	110

Resistance is based on 6 lbs per ton

Maximum permissible speed of the locomotive — 20 M. P. H.

THE WHITCOMB LOCOMOTIVE CO

ROCHELLE, ILLINOIS

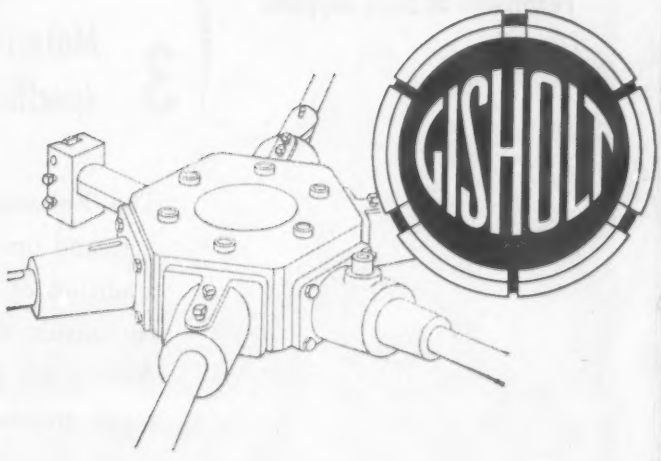
SUBSIDIARY OF THE BALDWIN LOCOMOTIVE WORKS

"There's *TWELVE* hours' work...completed in *EIGHT!*"

YES, the operators who knew the turret lathe of a few years ago will tell you that a 50% increase in production is not unusual for these new Gisholt Ram Type Machines.

Now, with many of the machine's functions made automatic, the simpler, easier operation of the modern Gisholts makes possible new standards of efficiency in turret lathe performance. With effortless selective automatic changing of spindle speeds, hydraulic clutching and braking, automatic indexing and clamping of the hexagon turret, and many other operating advantages, the new Gisholts have contributed much to the rapid production of essential war materials. And they will contribute a great deal more to the lowering of production costs in the postwar period.

Men responsible for increased production and lower manufacturing costs should obtain complete information about the new Gisholts.



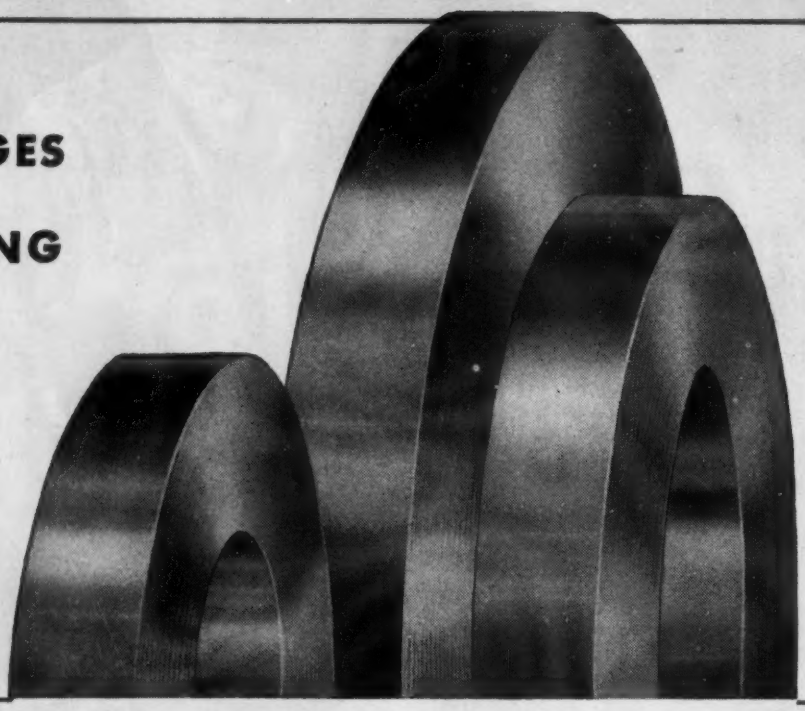
GISHOLT MACHINE COMPANY
1217 East Washington Avenue • Madison 3, Wisconsin

Look Ahead... Keep Ahead!!
With Gisholt Improvements in Metal Turning

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES • SPECIAL MACHINES

3 ADVANTAGES

IN SPECIFYING



Follansbee COLD ROLLED STRIP

Users of Cold Rolled Strip are certain of three important advantages in selecting Follansbee as their supplier.

1. **Prompt action on inquiries and on the scheduling and confirmation of orders.**
2. **Greater flexibility in the adjustment of mill schedules to meet contingencies.**
3. **Material which precisely meets the specifications accepted.**

The Follansbee organization is compact and highly skilled . . . and operates to standards of quality in keeping with its tradition of generations of fine steelmaking. You are invited to consult the General Offices or the nearest Sales Office or Agency on your requirements for Cold Rolled Strip or other steels or steel specialties.

FOLLANSBEE STEEL CORPORATION

GENERAL OFFICES • PITTSBURGH 30, PA.

Sales Offices—New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee. *Sales Agents*—Chicago, Indianapolis, Houston, St. Louis, Kansas City, Nashville, Los Angeles, San Francisco, Seattle; Toronto & Montreal, Can. *Plants*—Follansbee, W. Va. & Toronto, O.

ALLOY BLOOMS & BILLETS. SHEETS & STRIP. CLAD METALS. COLD ROLLED CARBON SHEETS & STRIP
POLISHED BLUE SHEETS • ELECTRICAL SHEETS & STRIP • SEAMLESS TERNE ROLL ROOFING

Welded Exhaust Pipe for Thunderbirds

Stainless steel is essential in aircraft exhaust assemblies because it resists the corrosion of hot exhaust gases. With thousands of these assemblies being fabricated each month, the ease with which this metal can be welded is an important factor in maintaining production.

Because of their corrosion resistance and strength, stainless steel aircraft parts can be made of relatively thin gauge metal. These properties will be valuable for many other industrial applications when the easing of wartime restrictions again permits the wider use of stainless steel.

BUY UNITED STATES WAR BONDS AND STAMPS

Other interesting uses of stainless steel are described in ELECTROMET REVIEW published by ELECTRO METALLURGICAL COMPANY, the Unit of UNION CARBIDE and CARBON CORPORATION that produces alloys for making steel. If you are an executive, engineer, or designer you can be put on the mailing list for ELECTROMET REVIEW by sending your name on your business letterhead to ELECTRO METALLURGICAL COMPANY, Room 328, 30 East 42nd Street, New York 17, N. Y.

More production per hour on shearing long sheets is made possible by the advanced design of 16, 18 and 20 foot Niagara Power Squaring Shears. Features include accurate, flat cutting; convenient handling of stock and offcut; more working strokes per hour; instant acting 14-point engagement sleeve clutch; gears mounted between anti-friction bearings; clutch and gears operate in oil-tight case; self measuring, ball bearing, parallel back gage. Write for Bulletin 72. Niagara Machine & Tool Works, 637-97 Northland Avenue, Buffalo 11, N. Y. District Offices: Cleveland, Detroit, New York.

BUY WAR BONDS

Shear knives available for cutting alloy and special steels. Let us know what you desire to cut. Prompt delivery on spare knives for Niagara Squaring Shears. Also factory re-grinding service by the same skilled men who grind new Niagara knives.

—Advt.

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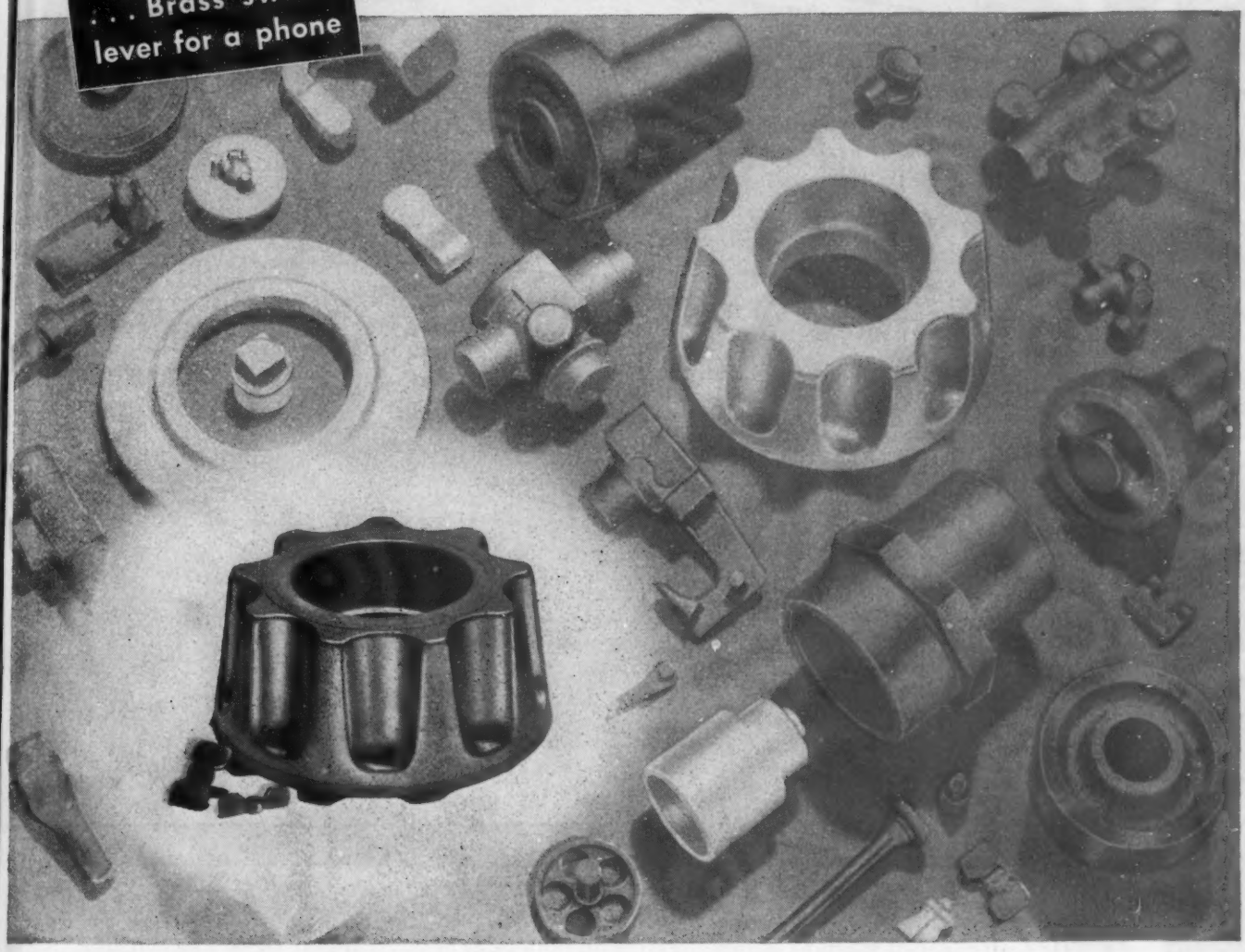
by the same skilled men who grind new Niagara knives.

BONDS

SCOVILL FORGINGS

for dependability
under difficult operating conditions

Aluminum (censored) for a plane . . . Brass switch lever for a phone



Censorship forbids telling you any more about the end use of the aluminum forging spotlighted above than that it's for a secret device on big bombers. We can say, though, that Scovill engineers, working backwards from the finished piece, designed and produced a forging that saved material and machining costs and helped retain in the finished piece the great strength required for its particular function.

Also under Government secrecy orders is the tiny, brass thumb switch lever for a hush-hush telephone. Scovill forges two levers in one piece and saws them apart to keep strength high and costs low.

Those and the other illustrated examples of Scovill's ingenious forging ability suggest that you, like more than 3,000 satisfied Scovill customers, can save time, trouble and money by letting Scovill do your designing, die-making and forging.

For further proof of Scovill's ability to design the *right* forging for you and produce it from the *right* metal, fill in the coupon below and get the free booklet "Masters of Metal".

Scovill
MANUFACTURING COMPANY
WATERBURY 91, CONN.

Please send me a free copy of *"Masters of Metal"* booklet describing your facilities. I am interested in the metal forgings applications checked.

☐ Valves, Torch Heads, Regulators, for compressed gas cylinders, Welding and Blow Torches, etc. ☐ Household Appliance Parts ☐ Plumbing Goods (valves, etc.) ☐ Industrial Instrument Parts ☐ Aircraft Parts ☐ Communications Equipment Parts ☐ General Electrical Product Parts ☐ Fire Extinguishers ☐ Cameras ☐ Oil Burners ☐ Band Instruments

Other applications.....

SCOVILL MANUFACTURING COMPANY

Forgings Division
20 Mill Street, Waterbury 91, Connecticut

Name .....

Company .....

Address .....

-P-R-E-C-I-S-I-O-N- *Push-Button P*

THIS Cross Special Machine shapes the faces on both sides of internal gear teeth. The machine features: • Hydraulic knee raises and lowers the work spindle for loading convenience • Hydraulic foot pedal clamping, freeing both hands for loading • Reciprocating cutter action that rounds both sides of tooth-face simultaneously • Automatic electric push button control • Automatic intermittent indexing from tooth to tooth.

☆ Extreme accuracy is obtained by centering each tooth individually, after indexing.

Cross Special Machines will reduce costs and increase production—essentials in meeting competition in the forthcoming postwar market. Let Cross Engineers help you plan for reconversion now. Write the Cross Company, Detroit 7, Mich., Dept. 164.

CROSS

New York • Chicago • DETROIT • Cleveland • Cincinnati

...on Production

SPECIAL MACHINES

for automatically performing any one or a combination of metal cutting operations

TURNING · MILLING · DRILLING · BORING · REAMING · TAPPING · GRINDING

OFFICE OF GENERAL MANAGER

DETROIT-LELAND HOTEL

DETROIT, MICHIGAN

CHARLES H. LOTT

We are still soliciting goodwill. The Detroit-Leland Hotel will never have a surplus of this priceless asset.

In these days when there are more customers than merchandise, more guests than hotel rooms, we still don't want to forget concerns like your own who will be in business long after Victory is won and the world returns to normal.

May the service we give you today merit your doors being open to us tomorrow.

Charles H. Lott

Charles H. Lott
General Manager

WAR HAS TAUGHT INDUSTRY AN IMPORTANT LESSON

War is abhorrent, costly, wasteful—yet under the spur of its emergencies, new inventions are perfected, new processes discovered, new and better methods adopted.

Perhaps never before was a nation so unprepared for war as America was when the Japs struck at Pearl Harbor. Yet American industry, starting practically from scratch, forged the most efficient war production machine the world has ever seen. Implements of war flowed from our factories with record-breaking speed.

One of the reasons for this victory-making output was the production procedure that allotted the making of parts to sub-contractors. The proved success of this procedure is reflected in the postwar plans of America's leading manufacturers. They have seen for themselves that besides greater speed and increased output, such procedure offers the additional advantages of specialized workmanship, lower cost, lower capital investment, fewer labor problems.

The Joyce Machine Company has produced millions of dollars worth of parts for America's largest war plants. Joyce is equipped to perform this same service in the production of peacetime products. Whatever *your* product may be, let Joyce's specialized experience, modern equipment, extensive facilities and skilled workers help you get your product to market faster, better, cheaper. We are equipped to handle quantity production of machined metal parts for every field of industry—with emphasis on *precision* workmanship. A discussion of your production problems will entail no obligation. Wire, phone or write—today.

★

Close the Trap on the Jap—BUY BONDS

JOYCE
Machine Company
FRANKFORD • PHILADELPHIA
MANUFACTURERS OF PRECISION PARTS
AND SPECIAL MACHINES
FOR ALL KEY INDUSTRIES

"WE'VE FOUND JOYCE A SOUND CHOICE"

PARTS PRODUCTION FOR PEACETIME PRODUCTS

To Insure Your Enterprise TRY THESE FORMULAS

PRE-WAR TIME COSTS
TODAY'S and TOMORROW'S LABOR RATES
TODAY'S and TOMORROW'S OVERHEAD

= PROHIBITIVE SELLING PRICES

OR

NEW, MORE PRODUCTIVE TIME COST
TODAY'S and TOMORROW'S LABOR RATES
TODAY'S and TOMORROW'S OVERHEAD
INCREASED QUALITY

= PROFITABLE POST-WAR SELLING PRICES

RING GAGE ACCURACY AT PRODUCTION RATES BY
MICROHONING

Microhoning offers to industry a new tool with which to meet post-war demands for better products at moderate cost—at possibly increased labor rates. A process of final machining, **Microhoning now assumes added responsibility—it removes from .010 to .030 stock under automatic sizing control. By providing ring gage accuracy *at production speeds*, it offers a way of using the second formula to achieve profitable post-war prices.**

It will correct error in bores, or on cylindrical or spherical surfaces, either before or after heat treating—providing form and size accuracy to "tenths." In removing stock, it does not cause heat cracks. By removing distorted surface metal and cracks left by previous operations, it eliminates two of the most frequent causes of fatigue failure.

This modern abrading process also provides any desired surface finish. It is not limited in its application to iron and steel products, but is in successful operation on a wide variety of non-ferrous metals, such as silver-lined bearings and chromium-plated cylinder bores.

Micromatic Hone Corporation builds machines for Microhoning as required in industrial production. These range from tool room type machines arranged to handle a wide variety of work to multiple spindle production machines which provide accuracy and high speed on production parts.

Microhoning can be very useful in your post-war production. Let our engineers discuss applications with you.

MICROMATIC

MAKERS OF

New MICROMATIC HYDROHONER MODEL 705

MULTIPLE SPINDLES

AUTOMATIC ROTARY INDEXING

MICROSIZE CONTROL

MICRODIAL FEED CONTROL

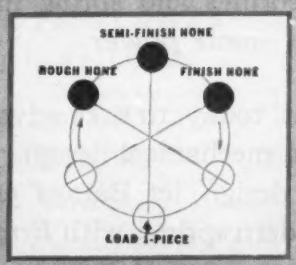
This new Micromatic Hydrohoner is a high speed production model, designed to produce large quantities of high precision parts. It may be used in multiple or progressive honing within uniform size limits (maximum) of .0003", on parts such as these:

Diesel Fuel Injectors, Pinion Gears, Precision Bearings, Bushings, Compressor Housing Bores, Piston Pin Holes, Connecting Rods, Valve Guides, Hydraulic Pump Bores, Rocker Arms, Ceramic Tubes, Valve Bodies.

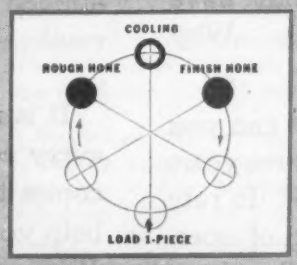
Variations in error which usually occur in production are corrected in straight run honing. Uniform size is automatically generated through the Micromatic Microsize Control—a positive, fully automatic method of generating uniform size.

Each spindle has its own individual Microsize Control, so that any desired combination in multiple or progressive honing may be set up.

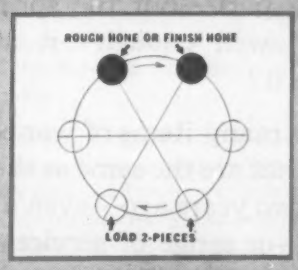
Three typical set ups are illustrated below:



THREE OPERATIONS. Progressive Honing Operations permit maximum stock removal per unit of time. Usually recommended for maximum stock removal ranging from .007 in ¼" diameter bores to .010 in 1" diameter bores.



TWO OPERATIONS. Progressive Honing Operations permit medium amount of stock removal per unit of time. Usually recommended for maximum stock removal ranging from .0035 in ¼" diameter bores to .005 in 1" diameter bores.



ONE OPERATION. Multiple Honing Operation permits conventional amount of stock removal per unit of time. Usually recommended for maximum stock removal ranging from .0005 to .0015 for hardened parts (55 Rock. C or harder), .001 to .003 for soft or medium hard parts, in bores from ¼" to 2" diameter.

HONE CORPORATION DETROIT 4, MICHIGAN

HONING MACHINE TOOLS

PEP UP SPRING *Performance*

WITH ENGINEERED PEP AND POWER

IT happens to the best of mechanisms, even today. Plans for improvement affect every moving part—but the spring. It may have worked well enough—it still works. Why change it?

How many items of war equipment can you name that are the same as they were three years ago—two years ago—even a year ago? In rate of fire—or range of service—or speed of operation—to some degree, performance has been stepped up. In many cases, this increase has been aided and abetted by engineering methods applied to the springs and spring materials; result, more *pep*—more *power*.

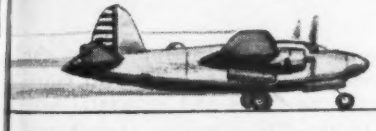
It is important, today, to take advantage of every advance in mechanical design. When it comes to spring design, let Barnes' craftsmen help you get modern springs with *Engineered Pep and Power*.

WALLACE BARNES COMPANY DIVISION OF ASSOCIATED SPRING CORPORATION BRISTOL, CONNECTICUT, U. S. A.

In Forgings you get

MAXIMUM METAL QUALITY

...co-etch cross section of connecting rod forging ...owing the result of hot working the plastic metal ...the drop forging process. Utilizing closed impres... dies, drop forging concentrates grain structure ...fibre-like flow lines at points where the complex ...sses of impact, torsion, whip, bend, and fatique ...ur in actual service. This result is obtainable only ...the forging process, which utilizes the physical ...perties inherent in a specific grade of steel, and ...proves them to meet a specific service condition.



7 ADVANTAGES Forgings Offer

1. **High tensile and impact strength** obtained through controlled concentration of grain structure and fibre-like flow lines.
2. **A correctly proportioned combination of physical properties,** in any specific grade of metal selected, to meet a specific service condition.
3. **Reduction of dead weight;** maximum strength and toughness in lighter sectional thicknesses.
4. **Reductions in cost at point of assembly** due to less time required to machine and finish, and fewer rejects, because forgings are usually free of concealed defects.
5. **Rapid assembly of complex parts by welding,** because forgings provide welding adaptability of widest range.
6. **A reduction of accidents to men and machines,** because forgings provide a greater margin of safety due to maximum development of metal quality by the forging process.
7. **Maximum strength and toughness,** developed through controlled concentration of fibre-like flow line structure of metal at points of greatest shock and stress.

When forging metals in closed impression dies, the grain structure and fibre-li flow lines inherent in the metal are controlled, directioned and concentrated meet the stresses and shocks which occur under actual service conditions. Th forging, with closed impression dies, utilizes to the utmost the physical properti inherent in a specific grade of metal, and develops the right combination of streng and toughness in the exact degree required.

A re-check of every stressed part, as well as simple parts such as handles and leve against the seven advantages forgings offer may reveal the possibility of improvi a part or a product. War time requirements developed many advancements in forgi techniques which now make forgings practical for many more applications and greater variety of equipment. Consult a forging engineer about how to proce to re-check parts against the seven advantages forgings offer. *Be sure you ha all the facts about forgings before specifying any material for stressed parts.* Utilize the broad experience of a forging engineer in obtaining all the advantages that forgings offer.

SYMBOLIC EMBLEM OF THE DROP FORGING ASSOCIATION

DROP FORGING ASSOCIATION
605 HANNA BUILDING · CLEVELAND, OHIO

DROP FORGING ASSOCIATION
605 Hanna Building • Cleveland 15, Ohio

☐ Booklet on "Metal Quality—Hot Working proves Properties of Metal."
☐ "Drop Forging Topics," issued ten times a

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Company
Address *City* *St*

AVERAGE INCREASE IN TOOL LIFE 400%

after Cold Treating in a Deepfreeze

Industrial Chilling Machine

Low Cost Chilling Operation Results in Higher Quality Production Tools to Accommodate Stepped-up Production Schedules

Here is what sub-zero temperatures are doing for one of the nation's foremost heat treating organizations. Records maintained since the installation of Deepfreeze Industrial Chilling Machines show that the cold treatment of all types of high speed cutting tools has resulted in an increase in tool life of from 20% to 1,000% with the average being in the vicinity of 400%.

GET RESULTS LIKE THESE BY COLD TREATING METAL CUTTING TOOLS

From 50 to 100 Pieces per Sharpening

100% Increase in Hob Life after Cold Treatment in a Deepfreeze

From 100 to 400 Holes per Grind

400% Increase in Tap Life; Finish Improved on Parts Machined after Cold Treatment in a Deepfreeze

From 70 to 700 Holes per Grind

1000% Increase in Drill Life after Cold Treatment in a Deepfreeze

From 1500 to 4500 Pieces per Grind

300% Increase in Cutter Life after Cold Treatment in a Deepfreeze

From 216 to 648 Holes per Grind

300% Increase in Broach Life after Cold Treatment in a Deepfreeze

A Complete Engineering Handbook on INDUSTRIAL COLD TREATING

This 42-page Deepfreeze handbook contains all of the data you need to put cold treating successfully to work in your plant. It includes a number of the better procedures, actual results attained by following them, a list of Deepfreeze users and numerous other extremely useful facts. Write today for your free copy.

INEXPENSIVE COLD TREATING PROCEDURES BRING OUTSTANDING RESULTS

Results like those listed above are attained by following simple, low cost cold treating procedures. Typical of these is the following:

Preheat 1400-1550° F., depending on analysis. (Double preheating is recommended, using 700-1000° F. first). Heat to hardening temperatures, depending on analysis. (2100°-2400° F.)

Quench in oil, lead, salt, or air.

Remove from quenching medium, at approximately 200° F., and transfer to tempering temperature.

Temper 2-4 hours to hardness specification. (1000° F. minimum). Allow tool to cool to 150° F.

Cold treat to −120° F., in Deepfreeze Chilling Machine for 3-6 hours, depending on cross-section. Allow part to return to room temperature normally. Repeat tempering cycle, using 25° F. lower temperature for 2-4 hours.

COLD TREATING HAS MANY INDUSTRIAL APPLICATIONS

The utility of sub-zero temperatures is not limited to the treatment of high speed cutting tools. It is used with equal efficiency to increase both the hardness and structural uniformity of any metal part; to speedily eliminate growth and distortion in gauges, gauge blocks, precision instruments of all kinds, etc., to contract metal parts for rapid shrink-fit assembly; for the purpose of testing and to perform numerous additional operations.

LEARN THE RESULTS OF APPLYING COLD TREATING TO YOUR PRODUCTION

Find out how cold treating can be put to work in your plant; how it will enable you to attain greater production economies, conserve valuable time and noticeably improve the quality of your products. You can determine the exact results of cold treating without cost by contacting Deepfreeze Engineering Service. Our staff of industrial refrigerating experts will make a complete survey of your production setup and inform you of the specific results you can expect.

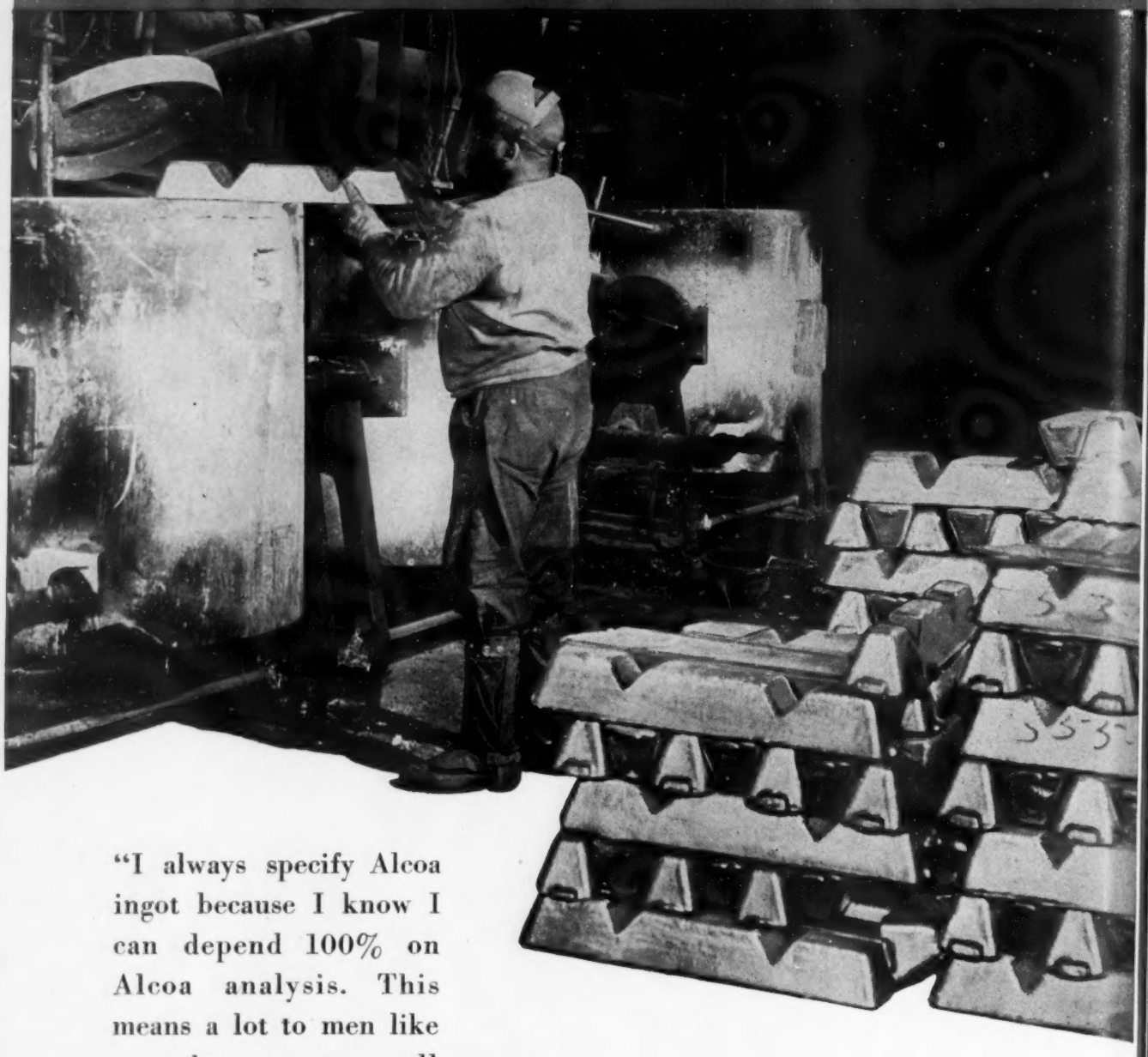
Only Deepfreeze Products can make a "Deepfreeze"

Deepfreeze

DEPT. S-8, 2301 DAVIS ST.
NORTH CHICAGO, ILLINOIS

IT TAKES QUALITY
TO MAKE QUALITY
AS YOU swing into the highly competitive market on strip, remember that M-H rolls with their greater resistance to indentation assure a better quality of finish for your product . . . and because these rolls have a deeper hardness penetration, they can be used down to scrap diameter without rehardening. Thus M-H rolls mean strip with greater sales attraction at a lower average cost.
MACKINTOSH-HEMPHILL CO., Pittsburgh and Midland, Pa.
Makers of the rolls with the red wabblers

The manager of a small foundry reports:



"I always specify Alcoa ingot because I know I can depend 100% on Alcoa analysis. This means a lot to men like me who operate small foundries and don't have a laboratory to check alloys before making mixes. Alcoa does the job for us...and the results are always right."

ALUMINUM COMPANY OF AMERICA, 2112 Gulf Bldg., Pittsburgh 19, Pa.

ALCOA FIRST IN **ALUMINUM**

ALCOA ALUMINUM

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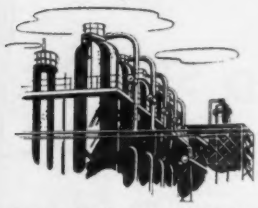
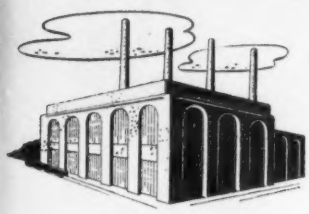
FLUID HANDLING EQUIPMENT

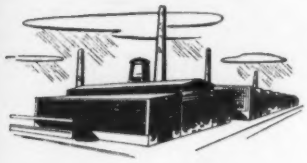
for



PROCESS INDUSTRIES



POWER PLANTS

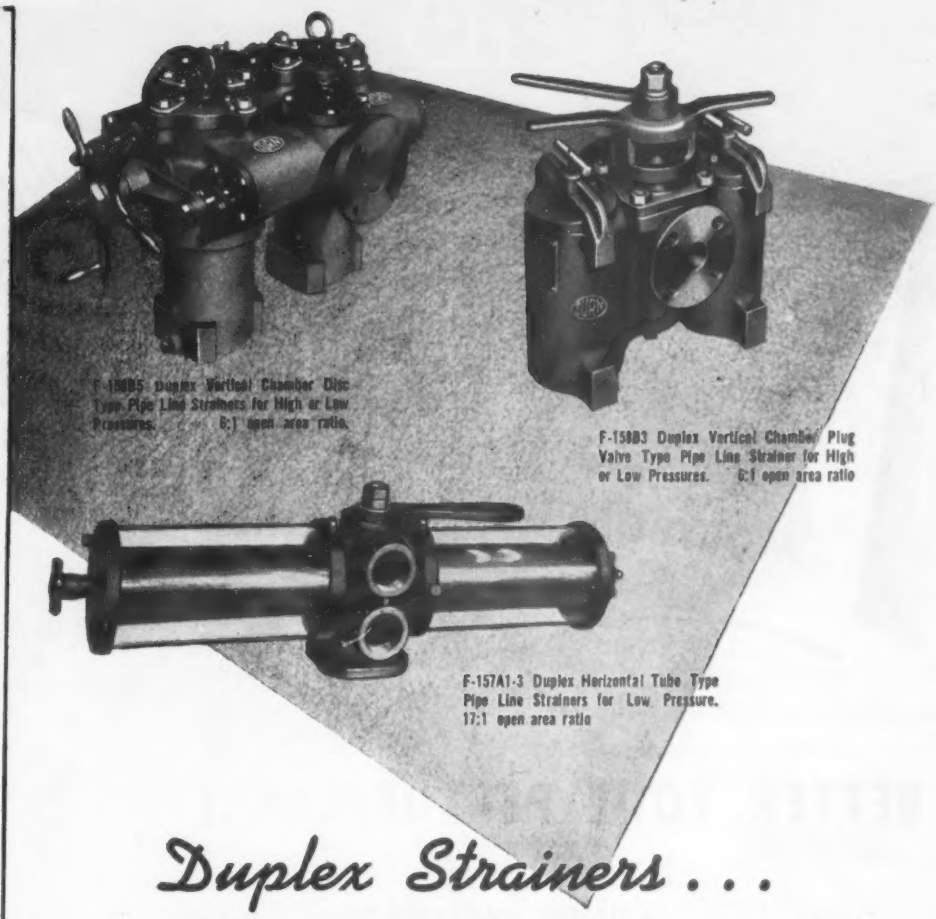


INDUSTRIAL PLANTS

ZURN FLUID HANDLING EQUIPMENT INCLUDES

Safety Vents • "Y" Strainers • Discharge Check Valves • Grease & Solids Interceptors • Sinlex Strainers • Duplex Strainers • Fire Line Strainers • Remote Valve Control Assemblies.

And Many Others



F-158B5 Duplex Vertical Chamber Disc Type Pipe Line Strainers for High or Low Pressures. 6:1 open area ratio.

F-158B3 Duplex Vertical Chamber Plug Valve Type Pipe Line Strainer for High or Low Pressures. 6:1 open area ratio

F-157A1-3 Duplex Horizontal Tube Type Pipe Line Strainers for Low Pressure. 17:1 open area ratio

Duplex Strainers . . .

DESIGNED TO PROTECT YOUR EQUIPMENT

Protects all types of pumps, traps, regulators, aspirators, injectors, control units, valves and other primary equipment. Keeps fluid conveying pipe lines operating freely and efficiently. Avoids clogging, contamination of transported fluids and fouling of equipment. Pressure, suction or gravity flow installations. Air, vapors, liquids and semi-solids services. Intercepts and accumulates precipitates, crystalline aggregates, dirt, sediment, scale, filings and other impurities. Easy-to-operate handwheel reverses valves simultaneously with minimum pressure drop—capacity flow at all positions of wheel. Quick access to basket chamber through removable covers provides easy and complete cleaning of strainer basket. Valves serviced without removing strainer from line. Contact Zurn Research & Development Dept. Our engineers may be able to recommend improvements in your pipe line facilities.

J. A. ZURN MFG. CO. SALES OFFICE AND FACTORY **ERIE, PA., U. S. A.**

J. A. ZURN MFG. CO., DEPT. ST., ERIE, PA. U. S. A.
Please send me Zurn Fluid Handling Equipment Catalog No. 45

Name..... Position.....

Company..... Address.....

City..... State.....

FORM NO. 45-83

ZURN *Industrial Division*

J. A. ZURN MFG. CO., ERIE, PA., U.S.A.

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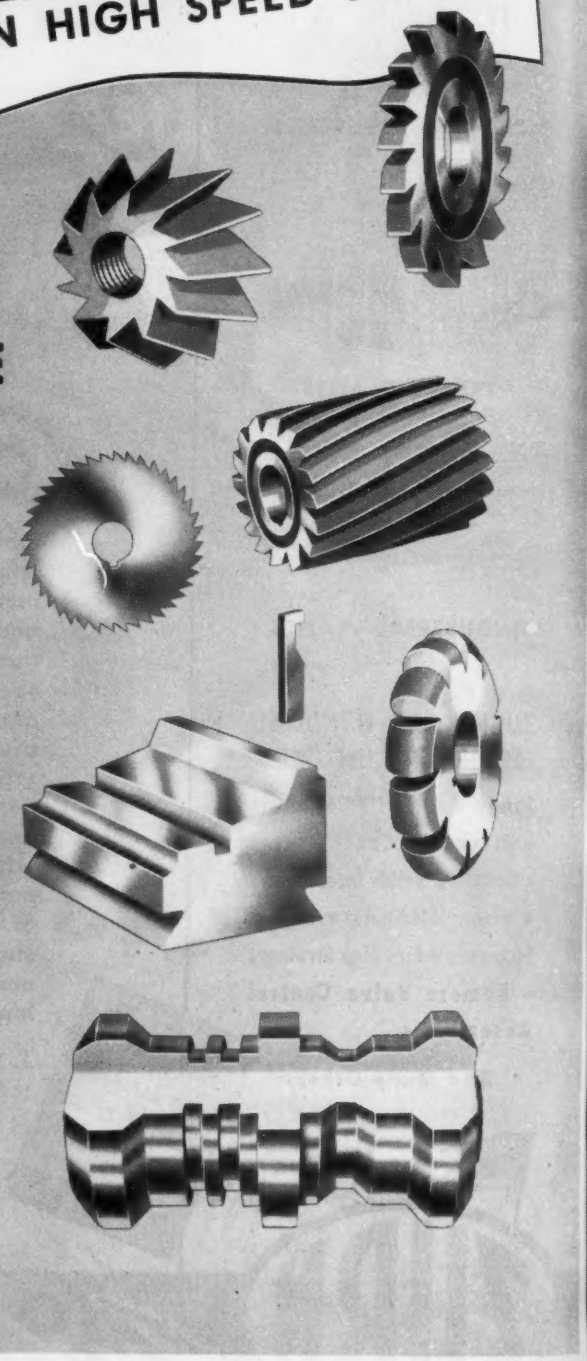
Specify one of these

MO-MAX

MOLYBDENUM—TUNGSTEN HIGH SPEED STEELS

for

BETTER TOOL PERFORMANCE



"LMW"	ALLEGHENY LUDLUM STEEL CORP.
"MOHICAN"	ATLAS STEELS LIMITED
"BETHLEHEM HM"	BETHLEHEM STEEL COMPANY
"MO-CUT"	BRAEBURN ALLOY STEEL COMPANY
"STAR MAX"	CARPENTER STEEL COMPANY
"MOLITE M-1"	COLUMBIA TOOL STEEL CO.
"REX T-MO"	CRUCIBLE STEEL CO. OF AMERICA
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"REX T-MO"	HALCOMB STEEL COMPANY
"MOGUL"	JESSOP STEEL COMPANY
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	ST. LAWRENCE ALLOYS, INC.
"S. T. M."	SIMONDS SAW & STEEL CO.
"MO-TUNG"	UNIVERSAL-CYCLOPS STEEL CORP.
"8-N-2"	VANADIUM-ALLOYS STEEL CO.
"VUL-MO"	VULCAN CRUCIBLE STEEL CO.

For the full story on MO-MAX high speed steels—their physical properties, their advantages, and how to heat treat them—write today to Department E for the new, revised MO-MAX Handbook.

★ ★ ★

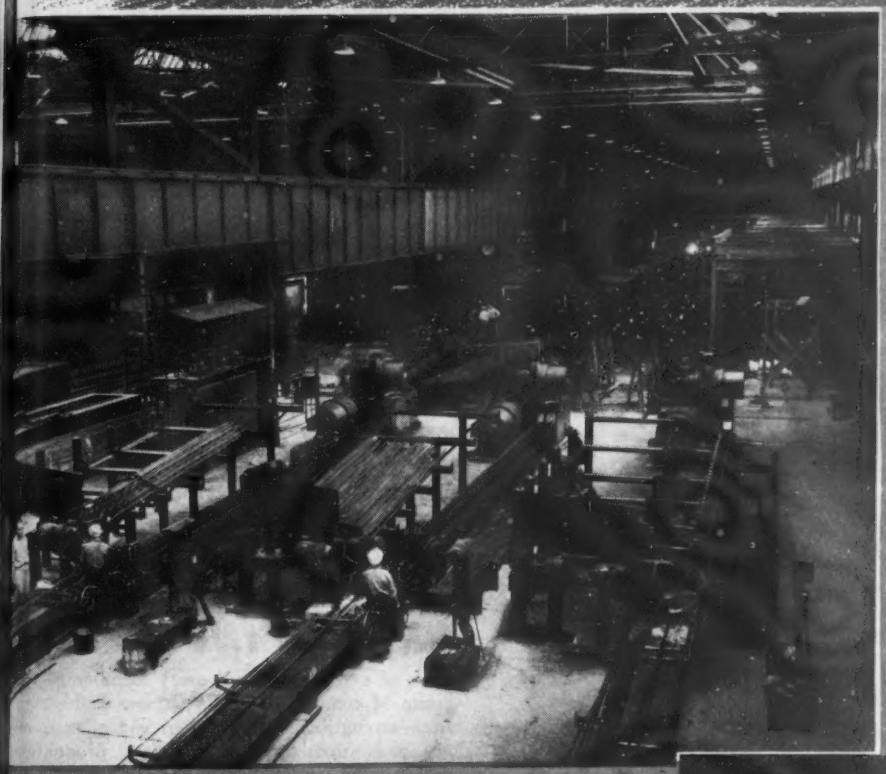
THE CLEVELAND TWIST DRILL CO. • 1258 East 49th Street • Dept. E. • Cleveland 14, Ohio

Vaughn

THE NAME YOU DEPEND ON WHEN . . .

COLD DRAWING EQUIPMENT

IS ON THE AGENDA!



Skilled Vaughn engineering, long Vaughn manufacturing experience, exacting Vaughn craftsmanship . . . summed up in Vaughn Machinery's performance on-the-job . . . place this equipment *first* in the consideration of modern operating and purchasing executives, for every cold drawing requirement!

THE VAUGHN MACHINERY COMPANY

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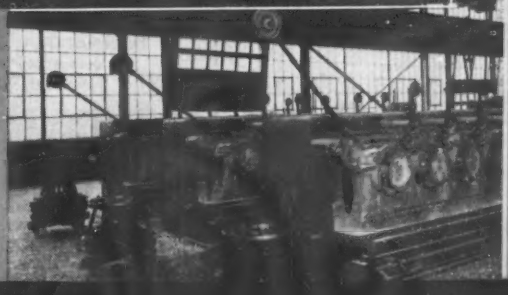

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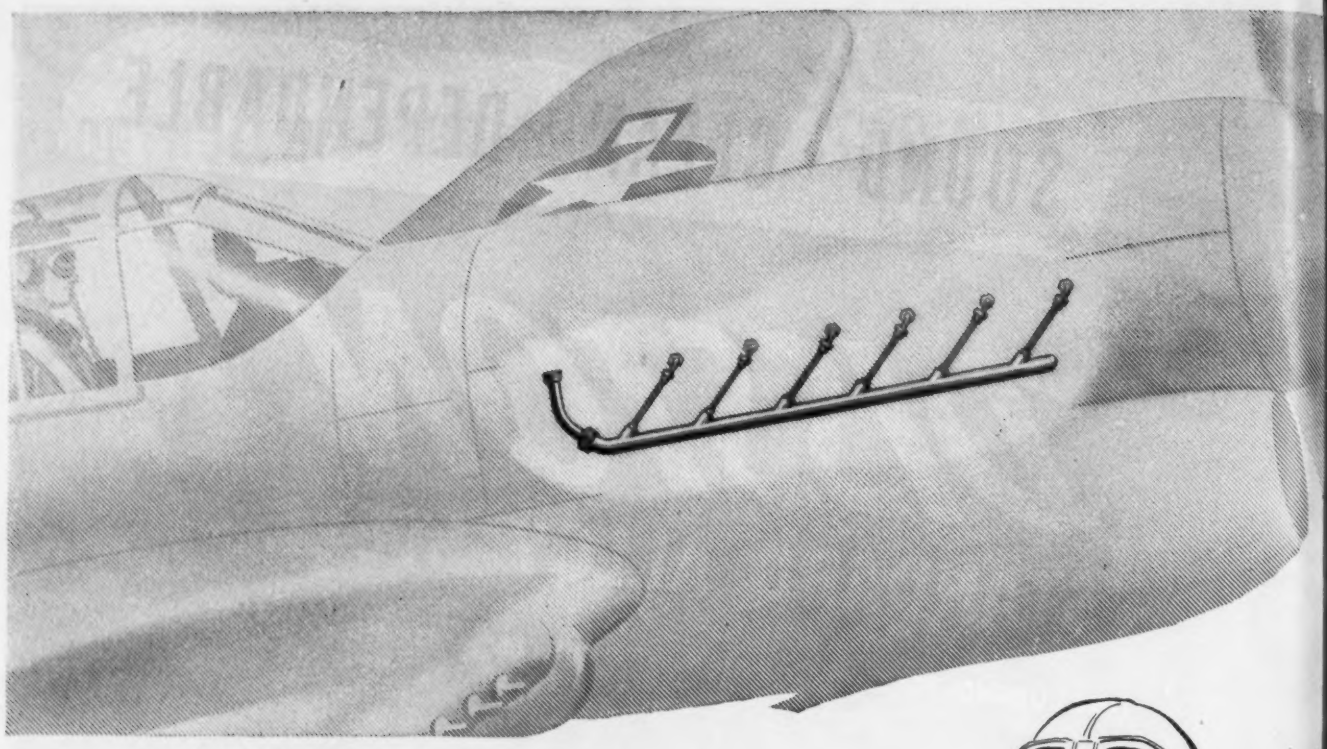

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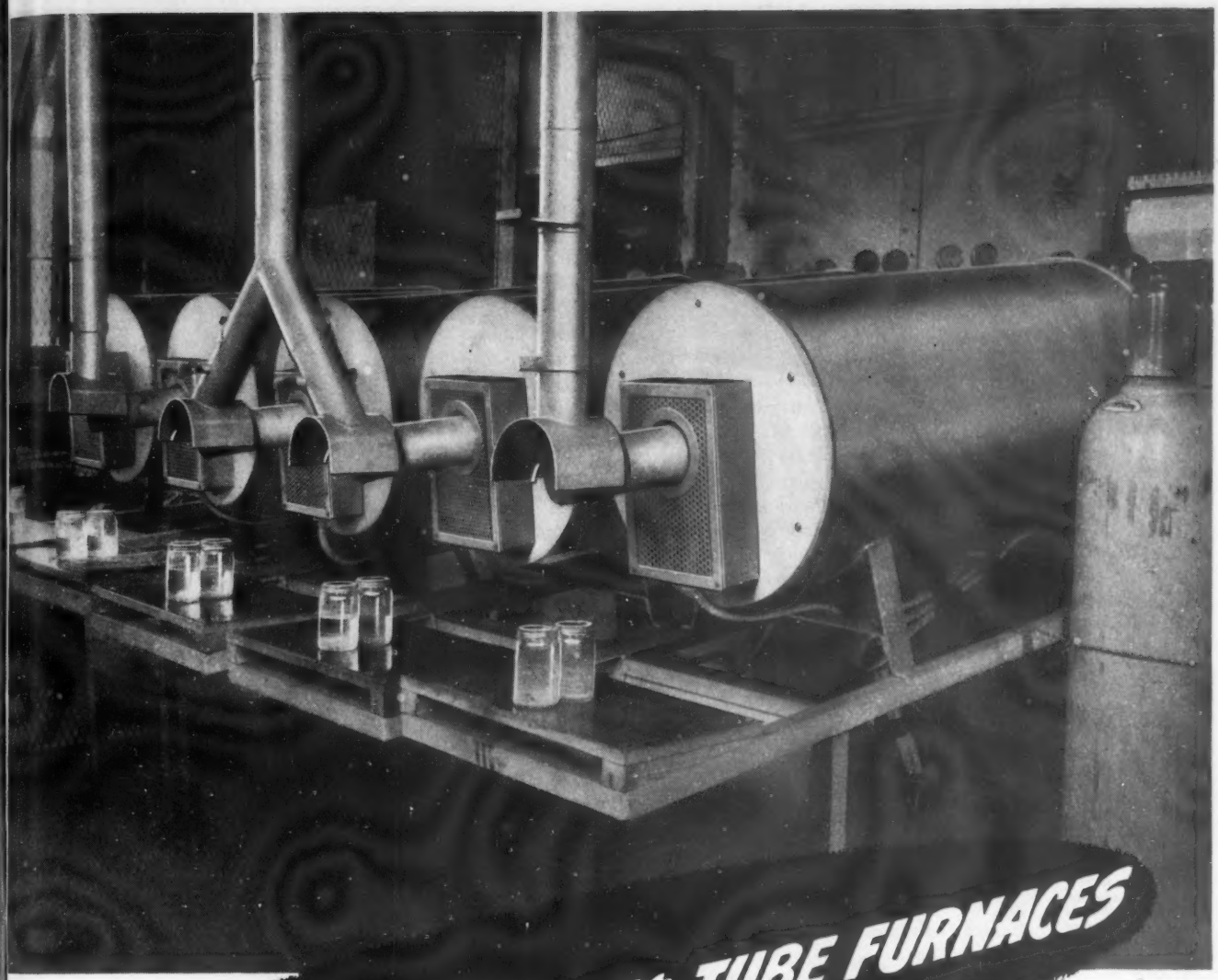

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STEEL

The Magazine of Metalworking and Metalproducing

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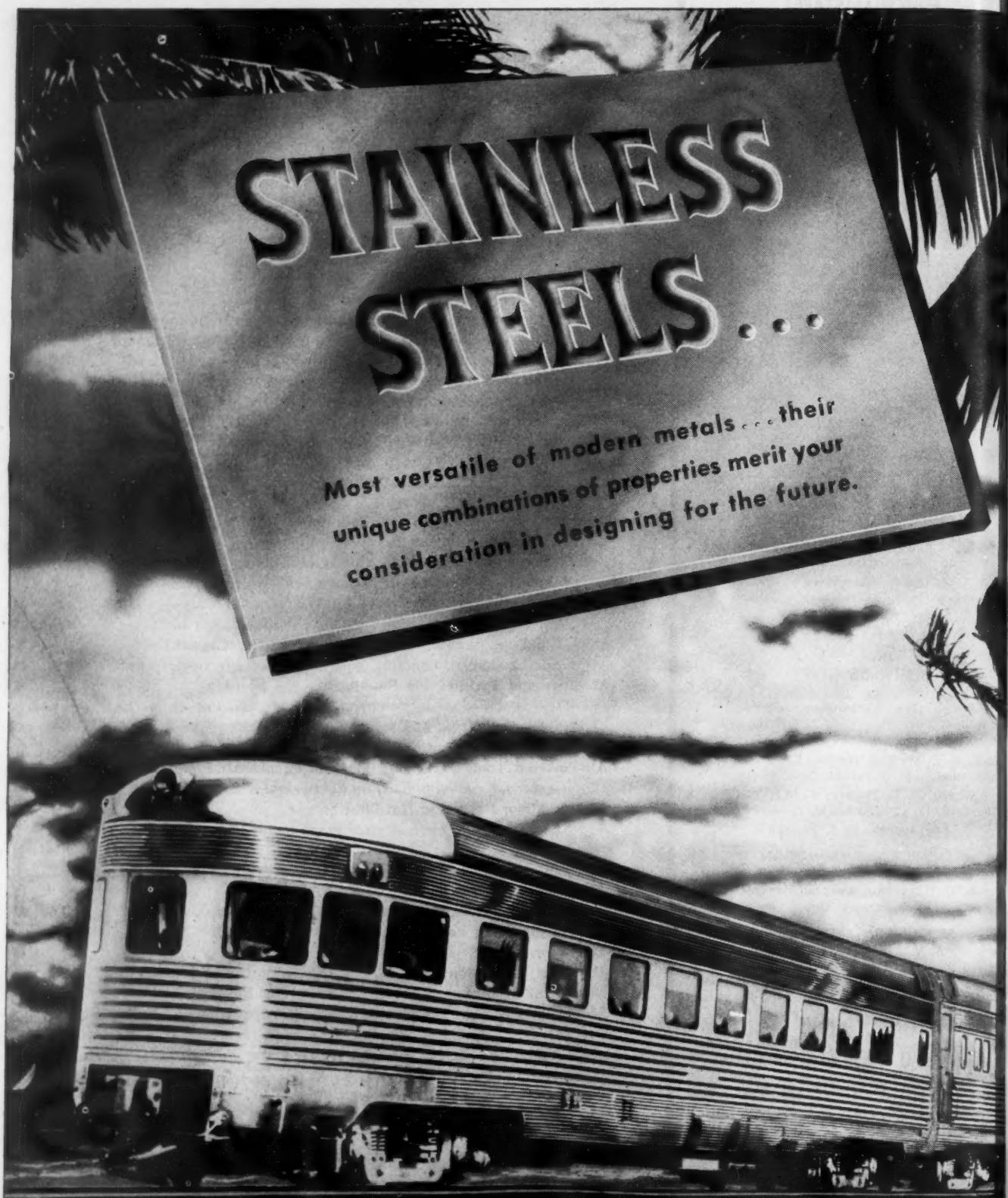
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STEEL
August 27, 1945

Best Defense Is Offense

Reconversion is not going to be easy, but it may be achieved more quickly than had been anticipated. In the short time that has elapsed since Japan's unconditional surrender was accepted, the government has moved with surprising speed and positiveness in removing restrictive controls. Concurrently industry has been quick to respond to its renewed freedom of action and to the incentive of resuming civilian operations at the earliest possible moment. Considering the suddenness with which the collapse of Japan developed, reconversion is off to a fairly good start.

However, if the prospects for a speedy shift to a peacetime economy are to continue to be promising, there must be a greater degree of unity and a greater harmony as to objective among the factions of the nation than is evident at present.

For example, this is a time when the first aim of every group should be to assist the country in adjusting its activities to a peacetime basis as quickly as possible and with a minimum of shock to the economic system. Yet not all groups are pursuing this objective. In fact, it is clear that certain elements of the original New Deal school of thought and a left wing section of the labor union movement are more interested in resuming social experiment on a grand scale than they are in working hard for successful reconversion and early prosperity.

One sees this clash of interests in the daily pronouncements regarding the outlook for employment. Most responsible government officials and employers believe that unemployment need not be too severe nor too prolonged if government, management and labor co-operate properly to facilitate reconversion. On the other hand some new dealers and union officials assume the attitude that severe and prolonged unemployment is inevitable and that immediate steps should be taken to provide for it.

Of course much of this bearish talk is blown up out of thin air in order to influence Congress to be as liberal as possible in its treatment of the various "full employment" and social security measures coming up for consideration in September. There is a deliberate campaign in progress to stampede the lawmakers into hasty passage of legislation containing a number of provisions of extremely dubious merit.

The best defense against this campaign is an offensive of actual performance. Every company that can convert quickly, does so and provides jobs, is helping to discredit the bear stories and to permit Congress to consider pending legislation deliberately and fairly.

TRIES WAGE GUARANTY: Wildman Mfg. Co., Norristown, Pa., manufacturer of knitting machinery, has signed a contract with a CIO local providing for a modified guaranteed annual wage.

It guarantees all employees (except executives, foremen, assistant foremen, supervisors and office workers) who have completed five years of continuous service 1200 hours of work or the equivalent of 30 weeks of 40 hours for a period of one year. The Pennsylvania unemployment compensation law provides $20 a week for 20 weeks. Thus the Wildman guarantee, plus state compensation, assures Wildman employees of pay for 50 of the 52 weeks.

The company will credit all straight time or overtime hours worked against the 1200 hours. If the company does not provide 1200 hours of work, the unworked hours will be paid for at the straight time hourly rate. Employees who quit voluntarily or are discharged for cause are not entitled to the guarantee. In event of a strike, the company shall be relieved of its guarantee as to employees striking.

The guaranteed wage feature came not as a re-

(OVER)

sult of a request by the union but rather as a proposal by management. It seems to be a sincere effort to achieve greater stability in employment and as such it will command the attention of many employers in the metalworking industries. —p. 73

• • •

LATIN-AMERICAN TRADE: American producers and manufacturers who are not familiar with the Council for Inter-American Cooperation are advised to make its acquaintance. It is not a government agency; it is a private organization actively engaged in carrying on where the federal Office of Inter-American Affairs left off.

Under the CIAC, Inter-American Centers have been established in 21 cities in the United States. These centers seek out companies, not previously engaged in inter-American business, which could market their products successfully in Latin-American countries. They discourage companies whose entry into the market south of the Rio Grande would be unprofitable, unsound or detrimental to inter-American relations. The aim is to promote sound trading and to prevent undesirable exploiting of this attractive market.

A good tip is to contact the Inter-American Center nearest your plant and see if its program has opportunities which merit your participation. —p. 78

• • •

SHIFTOVER IS SPOTTY: It is too early to predict how long it will take industry to shift over to peacetime operations. A few companies reconverted overnight, more already are well on their way toward reconversion, and many others—some of them confronted with difficult problems—are in a state of confusion.

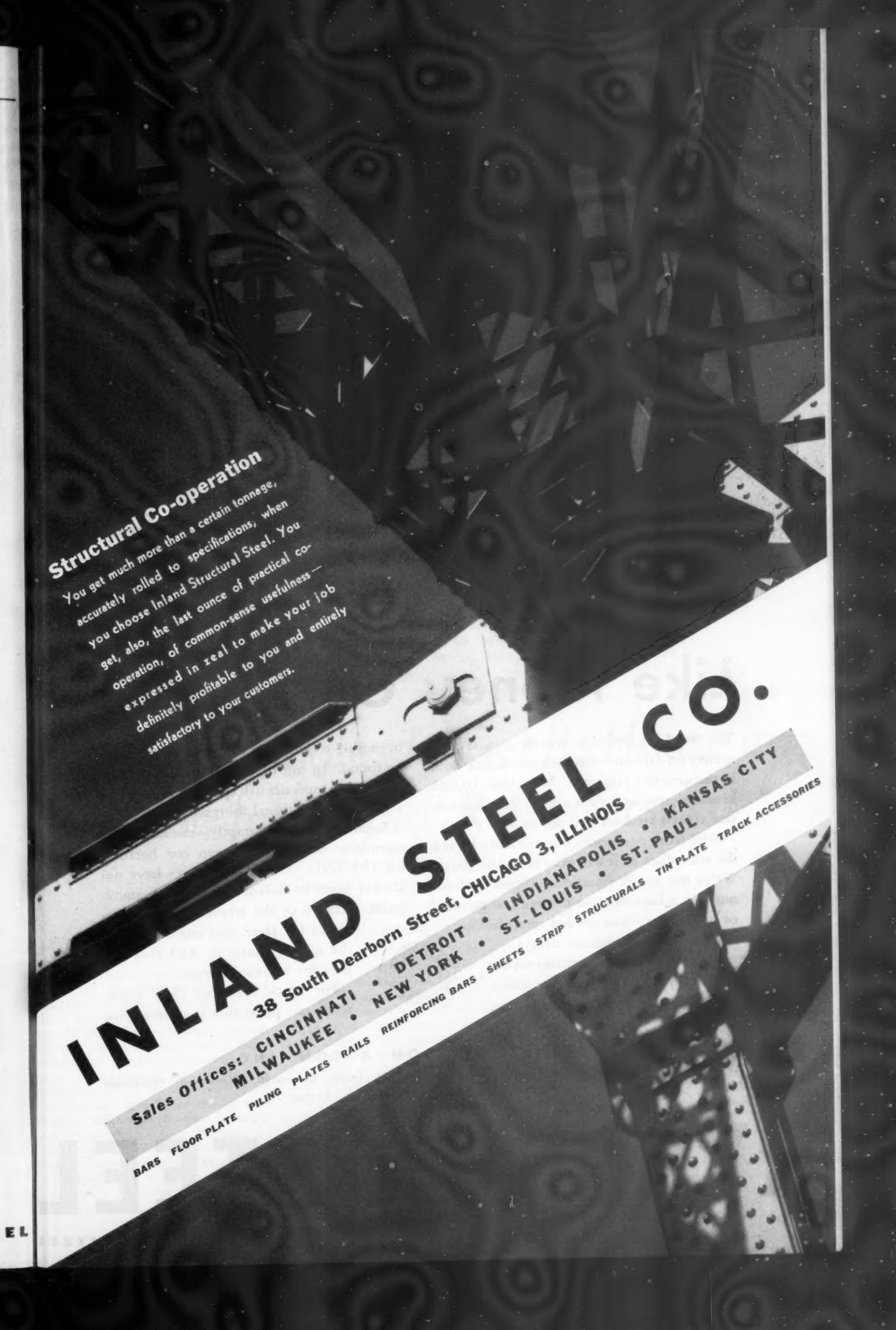
The situation also is spotty regionally. A WMC survey indicates that only nine of the nation's 166 principal labor market areas face the prospect of extremely serious temporary unemployment by Oct. 15. A round-up of reconversion progress conducted by the editors of this publication shows that some areas are only slightly affected, whereas others—particularly Detroit—are hard hit.

A factor which may have an important bearing upon the progress of reconversion is the labor relations situation. A wave of strikes could play havoc with the shiftover to civilian production. That is one reason why President Truman's attempts to develop a consistent government labor policy and his forthcoming conference on labor relations assume current significance. —pp. 69, 72

POSTWAR POSTSCRIPTS: University of Wisconsin, through a grant from Carnegie-Illinois Steel Corp., is conducting experiments to determine the functional requirements of dairy farm buildings. Carnegie-Illinois, in turn, is developing structures to meet these requirements. Among these developments (p. 91) is a system of site welded steel frame farm buildings for which its sponsors foresee a new market for structural steel of 50,000 tons annually for the early postwar years and a potential of a half-million tons annually. . . . Dun & Bradstreet's number of business failures during victory holiday week (p. 158) was lower than that of any other week on record. . . . Volta Redonda steel plant in Brazil is almost ready to go into operation. Coke ovens, blast furnace and power house are completed (p. 79) and three open hearths are scheduled for operation in September. . . . In a survey conducted by this publication last year, about half of the 1922 manufacturers consulted said they wanted more special steel shapes for welded construction. Suggestions by numerous experts as to the shapes desired are now presented in a symposium (p. 104) which should interest producers as well as consumers of rolled steel for fabrication. . . . Figures on steel consumption during the war show that the merchant fleet was the largest outlet for steel. Merchant shipyards took 22,150,000 tons (p. 74), whereas yards engaged in Navy ship construction received 13,370,000 tons. . . . Vice Admiral Land, chairman, Maritime Commission, believes "ship breaking" offers postwar business opportunities. His idea (p. 75) is that companies could dismantle ships systematically and find the best markets for the materials, parts and equipment, similar to the way automobile "graveyards" operate. . . . A committee has been formed to study and make recommendations for the disposal of ferrous and nonferrous scrap, especially that located overseas. The question (p. 74) is whether it should be returned to the United States, stockpiled abroad for later disposition or sold locally. Steel mills and foundries consumed 207 million tons of iron and steel scrap from Pearl Harbor to unofficial V-J Day, Aug. 14. . . . When President Truman notified Allied nations that the lend-lease program is being terminated (p. 82) Uncle Sam had shipped to United Nations under the program more than $40 billion worth of goods and had received as reverse lend-lease supplies and services worth $5 billion.

E. L. Shaner

EDITOR-IN-CHIEF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RECONVERSION CABINET: Directing the reconversion job from Washington are these agency heads: Left to right: J. A. Krug, War Production Board chairman; Chester Bowles, chief, Office of Price Administration; Frank L. McNamee, deputy director, War Manpower Commission; William H. Davis, economic stabilizer; and John W. Snyder, director, Office of War Mobilization and Reconversion. NEA photo

Industry Struggles To Get Its House in Order for Rapid Reconversion

Most government controls removed but manufacturers must solve many problems before way is open to broad resumption of civilian goods production. Much temporary unemployment indicated. Steel industry's position favorable

INDUSTRY got down to the serious business of reconverting to peacetime production last week. How long it will take to effect the necessary adjustments in major lines of manufacture, however, is a question which must remain unanswered until the air is clearer than at present. For the most part industrialists are optimistic that reasonably quick reconversion can be effected though considerable unemployment and economic confusion are thought to be inevitable.

Government agencies have been quick to set in motion plans for transforming the economy back to a peacetime basis. In a series of sweeping moves the War Production Board has lifted all but a handful of controls on production and supplies, and even those remaining will be removed as quickly as possible.

In its latest move to speed the flow of peacetime products the board last week dropped 210 additional individual controls over industry.

Because of the tremendous military cutbacks the board canceled virtually all allotments of controlled materials and all preference ratings assigned by the Army, Navy, or United States Maritime Commission except the new "MM" military, "CC" reconversion, and "AA" emergency ratings. The board emphasized that cancellation of military ratings does not revoke general controls over steel, copper and aluminum. It does not mean revocation of the entire Controlled Materials Plan. Complete revocation of CMP is scheduled for Sept. 30.

In a letter to major war contractors and subcontractors, WPB Chairman Krug stressed the importance of diverting promptly to civilian industry the following items: Steel sheet and strip, structural steel, gray and malleable iron castings, lumber, shipping containers, electric motors, cotton broad woven goods.

Following immediately in the wake of the wholesale cancellation of war contracts, running in excess of $30 billion, war production plants have shut down on a wide scale with considerable resulting

unemployment. However, a survey by the War Manpower Commission indicates that only nine of the nation's 166 principal labor market areas face the prospect of extremely serious temporary unemployment by Oct. 15. It is estimated that between 20 and 25 per cent of the work force of these areas will be job-hunting by mid-October.

General steel production should not be too adversely affected by the ending of the war. Despite the fact reconversion in the interim period following cessation of hostilities in Europe had not moved as swiftly as the industry had hoped and notwithstanding the fact that the end of the war in the Far East came with unexpected suddenness, general trade opinion now holds that transition to peacetime is going to come rapidly nevertheless.

Some trade leaders doubt if general steel production not considering the holiday interruption will go as low as 70 per cent, as a result of war cutbacks and cancellations, and, whatever the dip, they look for production to be well on its way up again before the end of this year. Within a few months steel production may actually go as high as 90 per cent.

Operating Rate Turns Upward

Steelmaking operations were hit hard over the Jap surrender holiday but since have turned upward and indications are near-normal operations will be attained quickly. Mill managements, however, are faced with a difficult problem of getting their order books into shape and until this is done delays will be encountered in scheduling civilian tonnage for rolling. However, since considerable unrated civilian business had been accepted prior to the end of the war there is every prospect that steel operations will be well supported over the next few weeks.

Situation at various major steel and manufacturing points throughout the country is reported by STEEL's representatives in these areas as follows:

Ordnance Plants Affected

PHILADELPHIA—Steel mills producing shell and gun forgings and bombs have been hard hit by postwar cancellations. District shipyards are laying off in substantial numbers.

It is estimated by War Manpower officials that about 50 per cent of the plants in the immediate Philadelphia area will be unaffected by reconversion. However, various companies will be hit rather drastically for the present.

It is believed that metalworking plants in general will be well on their way to peacetime production within another three months.

Some Lines Hit Hard

NEW YORK—Because of its wide diversity of industry and the fact a number of its metalworking shops have been considerably engaged in essential civilian requirements, this district has felt the force of war end cancellations relatively less than some other districts. However, in certain lines, particularly aircraft, cutbacks have been heavy and it would appear metalworking plants on the average will have rough going for at least three months.

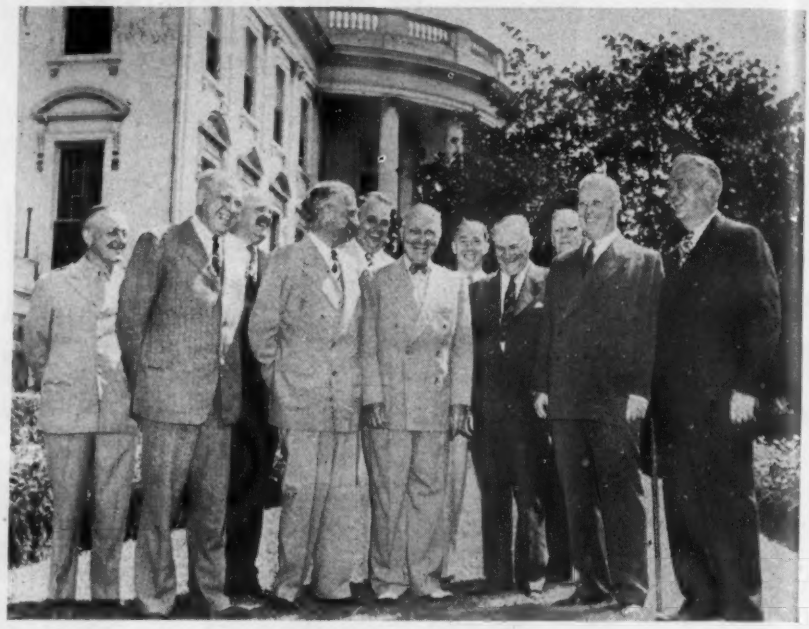
Approximately 440 war plants in the New York Ordnance District, covering lower New York state and northern New Jersey, received cancellations within a few days after peace was announced. These cancellations involved approximately $180 million in unfinished production.

Transition Underway For Some Time

BOSTON—Re-equipment of three major New England industries, textiles, footwear and pulp-paper, has been underway and gradually gaining momentum for some weeks. To this extent reconversion is simplified. In all three a heavy pentup demand exists for machinery replacement.

Relatively minor are details for return to civilian production by major industries and older established firms in the steel and metalworking industry.

Machine tool industry expansions with few exceptions have been privately built. Cancellations are appearing, but not in serious volume. Peace backlogs in some shops making special tools are substantial. On the whole, machine tool industry is not suffering to the extent predicted by some from heavy buying of recent years, although disposal of an increasing number of new surplus tools remains a problem. Slightly more than half the estimated rated backlog of about $150 million is likely to be finally canceled, but the industry has close to $100 million in unrated orders.



GOVERNORS PLAN RECONVERSION: Seven governors, members of the executive committee of the National Governors' Conference, meet with President Truman to discuss the return of employment services to the states, and pledge their support in reconversion programs. Pictured here in the White House gardens are, left to right: Maj. H. E. Bowman, aide to Governor Martin; Gov. Raymond E. Baldwin, Connecticut; Gov. Herbert B. Maw, Utah; Gov. Edward Martin, Pennsylvania; President Truman; Gov. Chauncey Sparks, Alabama; Samuel Bernstein, Chicago, commissioner of unemployment compensation; Frank Bane, secretary of the Governor's Conference; Gov. Earl Warren, California; and Gov. Harry Kelly, Michigan. NEA photo

Steel Recovering at Cleveland

CLEVELAND—Steel producing companies in the Cleveland district were slowly readjusting their operations to a normal basis last week, following disruption due to the sudden collapse of Japan and the subsequent widespread cancellation of war contracts.

Total displacements in Cleveland's industrial working force of about 575,000 was only 51,000, or approximately 9 per cent. It is expected this percentage will rise to nearly 12 per cent by Oct. 15. In the War Manpower Commission's fifth region, comprising Ohio, Michigan and Kentucky, layoffs totaled some 405,000 during the first ten days following Japan's surrender offer. Some

100,000 of these were only temporary displacements while firms prepared their facilities for civilian production, but these were expected to be counteracted by an additional 100,000 layoffs during the next 30 days.

Unemployment was due, of course, to the heavy volume of war contract cancellations. In northeastern Ohio, Navy cancellations totaled 700 contracts, involving 200 prime contractors.

Industry Moves Cautiously

PITTSBURGH—Faced with further war contract cancellations, and exact status of production schedules yet to be determined following cancellation of over $350 million in government orders, Pittsburgh industry is treading cautiously into the reconversion period.

Steel industry officials are beset with bookkeeping complications resulting from cancellation of orders, by a series of strikes, and in a few instances by some holdups on "unrated" business.

The slack in employment resulting from wholesale war contract cancellations, expected to reach about 35,000 persons here over the next few weeks, should be absorbed before the end of this year through reconversion to peacetime production.

Resumption Slow In Valley

YOUNGSTOWN—This district's big industrial plants are getting slowly to work after the Jap surrender holiday. Steel production during the victory holiday was the flattest in history; not a pound was turned out for most of the two days.

Cancellation of the war contracts left steel producers with a badly muddled order situation which will take at least 10 days or two weeks to straighten out.

Steel plants report a good volume of civilian business in sight.

South in Good Position

BIRMINGHAM—This hub of the industrial South, so far as iron and steel are concerned, enters the postwar period in better position than many of its neighbors, who shared more liberally in the hectic distribution of strictly war plants.

Almost without exception the district's basic industries are entering upon civilian production with little or no reconversion problem.

Steel industry has sufficient backlogs to assure normal or capacity production for "some time to come."

Seek To Adjust Quickly

CHICAGO—Steelmakers here weathered the initial transition with less shock than had been anticipated. Operations during the Jap surrender week dropped to 40 per cent.

During the holiday, order and scheduling departments worked long hours to process cancellations and to clear unrated tonnage already in hand for insertion in production schedules. The fact that considerable civilian business was already in hand ready to be scheduled facilitated the readjustment and succeeding days brought in additional orders. Cancellations are still coming in and much confusion exists, but most mills had a sufficient volume of rated orders which were not suspended to afford a good level of operations.

Some mills so far have gone no further than to realign schedules for August and September.

As of midweek, it was estimated that upwards of 80,000 people had lost their jobs through closing of Chicago area war plants. About 80 per cent are women.

Many Job Openings at Buffalo

BUFFALO—Despite estimates that between 40,000 and 45,000 are unemployed in the area due to sweeping cutbacks and cancellations in war contracts, there are approximately 5000 job openings in heavy industries and other jobs are going begging in retail services as unemployment insurance payments soar.

Contract Cancellations Heavy

DETROIT—While district offices of materials and parts suppliers here have been inundated with bales of telegrams from prime contractors stopping production and shipments, they have generated no grief, since they have been expected for several weeks.

Detroit Ordnance District seven hours after the announcement from the White House of the Jap surrender had filed telegrams to terminate or cutback approximately 2000 contracts in the Detroit area, involving $1.5 billion. About 500 plants were involved, with these carrying from 35 to 40 per cent of the entire ordnance contract load in the U. S.

Reconversion holiday has dawned for an estimated 200,000 or more working people, and on Monday, Aug. 20, for example, the Michigan Unemployment Compensation Commission here handled 15,000 applications, against a normal 3500.

Mid-Central Procurement District of the AAF announced cancellation of 700 prime contracts in the Detroit area.

Local steel mills had varying shutdowns, Great Lakes Steel Corp., for ex-

(*Please turn to Page* 180)

Present, Past and Pending

■ FARM MACHINERY, CONSTRUCTION ORDERS REVOKED

WASHINGTON—War Production Board has revoked order L-257-c covering farm machinery production and has removed restrictions on construction of factories and plants.

■ GARY ARMOR PLATE PLANT DECLARED SURPLUS

CHICAGO—Gary armor plate plant, operated by Carnegie-Illinois Steel Corp., has been declared surplus by the Army and is offered for sale.

■ FIRMS OFFER TO BUY, LEASE GOVERNMENT PLANTS

WASHINGTON—Kaiser-Frazer Co. is negotiating a lease on the Willow Run bomber plant for manufacture of automobiles and farm machinery. Reynolds Metals Co. has offered to operate under lease and to ultimately buy certain government-owned aluminum plants. Western Electric Co. Inc. has offered to lease an aircraft engine parts plant in Chicago.

■ NASH-KELVINATOR OUTPUT SCHEDULES BOOSTED

DETROIT—Nash-Kelvinator Corp. has stepped up its time-table which launches an ambitious program calling for tripling prewar output of automobiles and doubling prewar household appliance and refrigerator volume.

■ STRIKE HALTS SLOSS-SHEFFIELD OPERATIONS

BIRMINGHAM—Sloss-Sheffield Steel & Iron Co.'s operations were halted last week by a strike of by-products oven and furnace workers.

■ SCRAP INVENTORIES DROP 53,000 TONS IN JUNE

WASHINGTON—Nation's steel mills sustained an inventory loss of more than 53,000 tons of iron and steel scrap during June, inventory dropping to 2,516,913 tons as of July 1.

■ LUSCOMBE PLANS CIVILIAN PLANE PRODUCTION

DALLAS, TEX.—Luscombe Airplane Corp. has plans for immediate manufacture in volume of the first postwar version of its all-metal personal airplane. Production schedule calls for 1000 by the year end.

■ NEW DRAW BENCH DEVELOPED BY AETNA-STANDARD

ELLWOOD CITY, PA.—A new rack-type draw bench for drawing ferrous and nonferrous tubes and bars, developed by Aetna-Standard Engineering Co., Youngstown, in collaboration with a large brass company, was demonstrated here last week at the company's plant.

Truman Labor Policy Seen Developing

Administration thought moving in direction of clear-cut setup to replace sprawling, incongruous arrangement inherited from Roosevelt

As far as the eye can see, Wright Aeronautical Corp. employees line up for their last pay after government contract cancellations close a B-29 engine plant at Woodridge, N. J. NEA photo

THE TRUMAN administration seems to have made considerable progress toward the objective of creating a clear-cut labor policy to replace the sprawling, incongruous setup it inherited from the late President Roosevelt.

This is made clear by the President's statement on Aug. 16, his executive order of Aug. 18, and by informal remarks of key executives who carry out the President's instructions.

In his statement and his executive order, the President revealed that the War Labor Board is to be disbanded as soon as possible, but that in the meantime it will function with reduced powers to settle labor disputes that would interfere with effective transition to a peacetime economy. The future labor policy, he stated, will be decided at a management-labor conference to be called at some early date. The trend, the President indicated, will be away from arbitrary, compulsory procedure on the part of the government, and will be toward general use of voluntary procedures.

Will Expand Conciliation Service

Toward that end, said the President, "the strengthening of the Department of Labor, and the unification under it of functions properly belonging to it, are going forward under plans being formulated by the Secretary of Labor. In these plans particular stress is being laid on the upbuilding of the United States Conciliation Service. With the return to a peacetime economy and the elimination of the present temporary wartime agencies and procedures, we must look to collective bargaining, aided and supplemented by a truly effective system of conciliation and voluntary arbitration, as the best and most democratic method of maintaining sound industrial relations."

The President's statement called upon representatives of organized labor and industry to renew their no-strike and no-lockout pledges for the "interim" period (up to the time of the coming management-labor conference). One of the participants in the White House discussions, Dr. George W. Taylor, chairman of the War Labor Board, later emphasized the fact that the President wanted this request renewed only for the interim period.

"We are all hopeful that after the industry-labor conference a new basis will be evolved," said Dr. Taylor. "None of us want to keep the no-strike, no-lockout pledge any longer than is absolutely necessary."

While it thus is the administration's hope to get the government out of labor disputes in the long future, except by the employment of the voluntary arbitration process, it remains to be seen whether that aim will be entirely accomplished. An examination of the sense of the executive order of Aug. 18 reveals that in general it contains nothing that is displeasing to labor leaders. Under its terms employers are free to raise wages and salaries as long as they do not make it necessary to raise price ceilings. The War Labor Board will continue to handle wage disputes involving potential price increases, is given power to correct maladjustments and gross inequities in wages, and retains the power to settle strikes that might interrupt essential military production or interfere with transition to a peacetime economy.

Some experienced Washington observers think that on the whole the order plays into the hands of the unions since it gives them wider latitude for enforcing demands on employers. This opinion is reinforced by two interpretations by Dr. Taylor. He was loath to declare discarded the "Little Steel" formula—the yardstick which has been so unpopular with labor union leaders, but close questioning brought this answer from him:

"Where the board finds an inequity arising out of these new conditions of reconversion, it has a duty to correct such inequities, the 'Little Steel' formula notwithstanding."

Dr. Taylor also held that the executive order, among other things, will prevent cutting of wages during the reconversion period without War Labor Board approval.

"An employer cannot cut wages without War Labor Board approval, as the cutting of wages would be under the Oct. 2, 1942, Wage Stabilization Act," he said. "There is no authorization given for wage decreases. The authorizations here are for wage increases, and the wage decrease question is an area that has not been worked out, largely because there has not been any widespread demand for it . . . . Downgrading is not precluded."

There is some question in Washington as to whether the decisions of the War Labor Board can be enforced now that the war is over. On this point, the President's statement declared simply: "I shall expect both industry and labor in that period (until a new plan is worked out at the coming management-labor conference) to comply voluntarily, as they have in the past, with the directive orders of the War Labor Board."

Seeks Balanced Wage Structure

Dr. Taylor thought that there would be little difficulty in getting contending parties to accept the board's directives during the reconversion period, particularly because industry generally has come to realize that a balanced wage structure is "good business." But he refused to state positively whether cases on noncompliance would be referred to the White House for seizure of the plants involved. In administration circles generally there is no desire to discuss this question, and it is evident from replies to questions that government officials hope there will be no noncompliance cases. The nature of the decisions to be arrived at in the coming management-labor conference will depend to a large extent on what individuals and groups are invited by the President to attend. On this point there has been no White House announcement but it is assumed that the labor spokesmen will be such leaders as Philip Murray of

), William Green of AFL, John Lewis UMW, etc. There is considerable interest as to who will be invited as representatives of industry. Manufacturers and businessmen hold many shades of thought as to wages, dealing with unions, and the President easily might set the tone of the conference by selecting men of known opinions. Too, nothing so far has developed as to when the meeting will take place. September at first was the month mentioned but the conference may be called at a later date now that the pressing problem of taking care of labor and wage disputes during the reconversion period has been delegated to the War Labor Board.

Commenting following issuance of the President's statement, Philip Murray of the CIO assumed that CIO unions would now avail themselves of the wage reopening clause which the WLB wrote into its decisions when it refused increases in excess of the "Little Steel" formula.

Under the new policy, Dr. Taylor said, some 16,000 applications now before the board for approval of wage increases no longer need WLB action, and will be referred back to the contending parties. Cases now pending before the WLB, Dr. Taylor said, will be decided on the basis of the new criteria as embodied in the President's executive order. Appeal cases, he said, will be handled on the basis of the criteria existing at the time when the dispute was voted on originally by the WLB regional board or commission.

Changeover Unemployment Program Suggested by CED

The Committee for Economic Development Research Committee last week released a comprehensive statement of national policy containing recommendations for facilitating re-employment and for assisting workers unavoidably idle during the changeover period.

The report was highlighted by emphasis on: Rapid demobilization and strengthened aid and protection to veterans in obtaining civilian jobs; prompt state action to raise unemployment compensation benefits and to extend duration of payments; a strengthening of public employment service to aid postwar migration and to assist the speedy placement of veterans and civilian workers; rapid blueprinting of a "reserve shelf" of public works for use if and when needed; provisions for retraining workers for their new postwar jobs; and finally, a strong recommendation that individual employers at once put into effect their postwar plans for rapid business expansion and the creation of new jobs.

The committee opposes arbitrary reductions in the prewar normal work week solely for the purpose of sharing employment.

Guaranteed Annual Wage Plan Effected by Metalworking Firm

Manufacturer of knitting machinery signs contract with steelworkers union guaranteeing minimum of 1200 hours work per year, or equivalent of 30 weeks on a 40-hour basis, to its 300 employees

RECENT announcement by the United Steelworkers of America (CIO) that what possibly may be the first guaranteed annual wage contract to be entered into by a metalworking company in this country has aroused keen interest throughout the industry. The contract is between the Wildman Mfg. Co., Norristown, Pa., manufacturer of knitting machinery, and the Steelworkers' local union No. 2977.

The contract, which went into effect June 28, guarantees a minimum of 1200 hours of work, or the equivalent of 30 weeks on a 40-hour basis, for a period of one year, and applies to all employees, other than executives, foremen, assistant foremen, supervisors and office workers, who have completed five years of continuous service with the company. Those eligible under the program as having met these service requirements, number about 300, or approximately 70 per cent of all company employees.

With the Pennsylvania unemployment compensation law providing $20 a week for 20 weeks, the 30-week work guarantee assures employees eligible under the Wildman agreement an income for practically the entire year.

Guaranteed Wage Provision

Provision for the guaranteed wage is set forth in Article II section D of the contract:

"The company guarantees to every employee who has completed five years continuous service in the employ of the company at the time of the execution of this agreement, a minimum employment of 1200 hours for the year covered by this contract. All hours worked by said employee, both straight time and overtime, shall be credited against the 1200 hours. If the company does not provide work for any part of the 1200 hours the employee shall be paid for the unworked hours at his straight time hourly rate.

"An employee who voluntarily leaves the employ of the company or is discharged for cause shall not be entitled to the guarantee. In the event of an employee's failure to take advantage of the available work hours such hours shall be deducted from the guarantee of 1200 hours. In the event of a strike the company shall be relieved of its guarantee as to employees striking."

The guaranteed annual wage feature, interestingly, came not as a result of a request by the workers, but rather as a proposal on the part of the management.

The guaranteed annual wage agreement is one of various provisions set up under the overall contract between the Wildman management and its employees —a contract scheduled to continue in force from year to year "unless and until either party hereto shall give to the other 30 days written notice of an intention to revise or terminate it." One of the provisions in the overall contract is that "under no circumstances shall there be any strike, lockout, or other interference with or interruption of the normal conduct of the company's business during the term of this agreement."

The contract was signed by Kenneth Howie, vice president and general manager, and H. Walton Wood, secretary, for the Wildman management, and by union representatives, headed by Philip Murray, international president.

Until recently the company has been actively engaged in producing war material, but it is now planning to resume production of knitting machinery.

AFA Plans 1946 Congress And Exhibit at Cleveland

The American Foundrymen's Association last week announced plans to stage its fiftieth anniversary foundry congress and foundry show in the Cleveland Auditorium, Cleveland, next May.

Coupled with announcement of the 1946 event is the intention to stage the meeting as an International Foundry Congress, with attendance from foundrymen of England, France, Belgium, Russia, Mexico, South America, South Africa, Australia, China and other countries. If held, this will be the third International Foundry Congress to which the American Foundrymen's Association has played host—the first being in Detroit in 1926, the second in Philadelphia in 1934. The international aspects of the 1942 convention in Cleveland were canceled due to war conditions.

The sudden complete cessation of war, it is felt, has made the problems of reconversion immediate and pressing almost overnight. A 1946 international congress is expected to make available to the foundry industry many outstanding and hitherto secret developments which have played a tremendous part in helping win the war and which will prove equally vital in the development of peacetime commodities.

Merchant Fleet Largest Steel Outlet in War

Analysis of shipments for armament from 1941 through April, 1945, reflect changing patterns of war production

ALTHOUGH the United States constructed the world's largest and most powerful Navy during the war in Europe, the amount of steel needed to build the fighting ships was only a little more than half the tonnage required to build the nation's merchant fleet, according to the American Iron & Steel Institute.

This was revealed in an analysis of figures covering shipments of finished steel made for armament purposes from the start of 1941 through April, 1945. Hitherto secret, the figures reflect the changing patterns of war production over four and one-third years, showing, in turn, the urgent period of naval construction, the expediting of shipments to Allied nations, and the preparations for the African and European campaigns.

The finished steel delivered to shipbuilders and makers of ordnance, projectiles, tanks and aircraft during the 52-month period totaled 63,568,000 tons, almost one-fourth of the total tonnage shipped to all consumers. Shipbuilding received 13 per cent of the total over that period. Makers of ordnance, projectiles and Army combat tanks received 9 per cent of the total.

Export Shipments Are 10 Per Cent

Export shipments required an additional 25,372,000 tons during the period out of the grand total of shipments, equivalent to about 10 per cent of the total steel shipped. In comparison with that tonnage, shipbuilders received 35,519,000 tons, of which yards engaged in the construction of Navy ships received 13,370,000 tons and merchant shipyards received 22,150,000 tons.

Immediately after the attack upon Pearl Harbor in December, 1941, shipments for naval construction began to climb sharply, rising from 157,000 tons in January, 1942, to a record of 490,000 tons in July, 1942.

Meanwhile, shipments of steel to merchant shipyards were increasing month by month during 1942, but the peak months for their receipts of steel came during 1943. The peak was 775,000 tons in August, 1943.

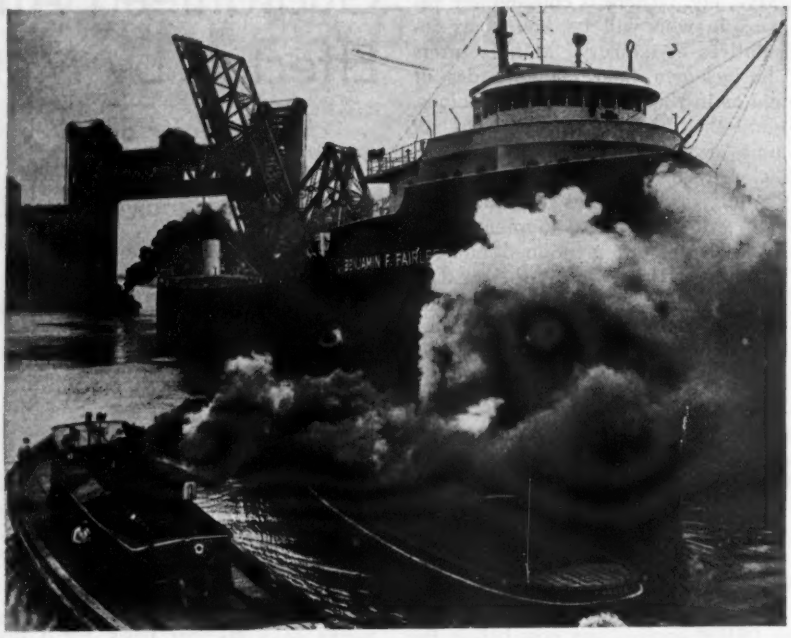
On an annual basis, shipments to naval and merchant yards combined were highest in 1943 at 11,508,809 tons.

Three months in 1942, July, August and September, were the heaviest months for exports of steel during the European war. In July of that year, a peak amount totaling 829,000 tons started abroad, with virtually seven-eighths of this tonnage destined for Great Britain and the British Empire. The year 1942 was the largest export year of the period with 7,660,000 tons, 12 per cent of the total finished steel that year, leaving the mills for overseas.

The record month in shipments of steel to makers of Army tanks came early in 1943 when the Allies were striving to clear the Nazis from Africa in mobile warfare. Makers of ordnance, projectiles and Army combat tanks received 24,728,000 tons of steel over the period of four years and four months.

May, 1943, and March, 1945, were the crests in shipments of steel for ordnance and small arms. In each of those months, shipments totaled approximately 143,000 tons.

Only a few months ago came a peak in shipments of steel to makers of shells, bombs, projectiles and ammunition for small arms. Shipments of steel to producers of those items totaled 606,000 tons in March of this year.



FREIGHTER IN THE CALUMET: The Benjamin F. Fairless, namesake of the president of the United States Steel Corp., and one of the largest and most modern ore carriers on the Great Lakes is shown here being towed up the Calumet river at Chicago. The carrier is 614 feet long, 67 feet wide. International News photo

Consumption of Scrap in U.S. Since Pearl Harbor Is Estimated at 207 Million Tons

FROM Pearl Harbor to the unofficial V-J Day, Aug. 14, steel mills and foundries of the United States consumed 207 million gross tons of iron and steel scrap for the manufacture of new iron and steel principally for the war effort, it is estimated by E. C. Barringer, president and executive secretary, Institute of Scrap Iron & Steel Inc., Washington.

This almost equals the tonnage that was consumed from 1930 to 1938, inclusive. It is equivalent to 3600 pounds for every man, woman, and child in the United States.

Of this total, 117 million tons were so-called home scrap, which represented the waste and by-products of the various manufacturing operations within steel mills and foundries. The remaining 90 million tons were supplied by scrap dealers after processing the waste and by-products of shipyards, railroads, and manufacturing plants, the collections of peddlers, and the results of salvage drives.

"Following this record-breaking consumption of scrap, the current total visible supply is now down to slightly less than 5,000,000 gross tons, indicating the desirability of the prompt sale of government surpluses and inventories so that scrap dealers may process this tonnage for use by steel mills and foundries

when they resume peacetime production," said Mr. Barringer.

Formation of a Special Industry Advisory Committee consisting of members of the steel, iron, aluminum and scrap industries was announced last week by the War Department. The committee was organized upon the request of Gen. Brehon Somervell, chief of the Army Service Forces, to study and make recommendations as to the disposal of ferrous and nonferrous scrap, especially that located overseas.

The committee is considering sending a group of five members to the European theater in order to see the problem firsthand before making its report to General Somervell. Members of the committee are: Robert Wolcott, president, Lukens Steel Co., Coatesville, Pa.; L. D. Green, Bethlehem Steel Co., Bethlehem, Pa.; N. Ebersole, American Rolling Mill Co., Middletown, O.; Carl A. Ilgenfritz, Republic Steel Corp., Cleveland; Joel Claster, vice president, Luria Bros., Philadelphia; Moris Schapiro, Boston Iron & Metal Co., Baltimore; J. B. Neiman, president, Federated Metals Division, American Smelting & Refining Co., Detroit; Edwin C. Barringer, president, Institute of Scrap Iron & Steel Inc., Washington; H. Dewitt Smith, mining engineer, New York; William G. Dross, executive vice president, Scovill Mfg. Co., Walton, Conn.; Walter Hochschild, vice president, American Metal Corp., New York; Carl T. Hieme, vice president, H. Kramer & Co., Chicago.

Controlled Materials Plan Eliminated as of Sept. 30

The War Production Board last week moved to eliminate at the end of September the priorities control system, including the Controlled Materials Plan, and to substitute a new, limited system for use during the reconversion period.

The changes were made through amendments to Priorities Regulations 28 and 29. The new Priorities Regulation 29 provides:

1. Cancellation, effective at once, of all "AA" preference ratings (which includes all ratings except the special "top priority" AAA, the new military MM rating previously announced, and the new CC rating described below) on purchase orders that call for delivery after Sept. 30, 1945. There is one exception—the AA ratings will still apply to textiles.

2. The revocation of the Controlled Materials Plan, WPB's master plan, for controlling wartime production, effective Sept. 30, 1945.

3. Cancellation, effective at once, of all allotments of steel, copper and aluminum (the three "controlled materials") for the fourth and subsequent quarters.

4. Introduction of a new junior, nonextensible, civilian "CC" preference rating to be used in limited cases to break bottlenecks in reconversion.

Postwar Ship-Breaking Industry Suggested by Admiral Land

Surplus vessels offered by Maritime Commission as emergency ends. Systematic dismantling and most remunerative disposition of scrap and components sought. Admiral sees chance for profits for "graveyard" operators

EXPLAINING rejection of bids on the first three merchant vessels to be offered for sale, Vice Adm. E. S. Land, chairman, Maritime Commission, says other uses were found for the ships before the bids were opened. He also infers that the bids were too low and points out that some months ago he suggested a modern "ship-breaking" industry under which "ships would be systematically dismantled and all parts sold to bring the highest return to the government and the taxpayer."

Admiral Land indicates disappointment with the downward trend in prices bid. Bids opened in June on a 9100-deadweight ton ship ranged from $15,500 to $22,500, whereas bids on two 10,500-ton Liberty ships opened in late July ranged from $9000 to $12,000 per ship. These prices are regarded as apparently having been calculated on the basis that the ships involved represented only scrap iron and steel. They did not allow for higher-priced materials in the ships, such as copper, nor for valves, fans, motors, clocks and many other items which have a high salvage value on the market.

Will Not Sell Too Cheaply

Rather than sell war-damaged and overage vessels at such prices, Admiral Land indicated the commission will find other utilization for them when possible. He says there are other means for disposing of ships incapable of further operation, but useful for certain limited purposes, so that while the commission may continue to offer under a planned program, some ships for sale as scrap, the right to reject any and all bids will be exercised.

Admiral Land hopes private companies will adopt his suggestion of setting up a "ship-breaking" business. As he sees it, they would dismantle ships systematically and find the best and most remunerative markets for the materials, parts and equipment comprising the ships. What he has in mind is something on the order of an automobile "graveyard" where old and wrecked cars are stripped down and the usable parts sold for use as replacements. Great Britain for years has had a ship-breaking industry. In view of the size of the merchant fleet which undoubtedly will be operated under the American flag in the postwar period, he feels, there should be a real opportunity for such an industry, particularly if operated by shipbuilding companies qualified by experience to judge the best methods of stripping and dismantling ships, and finding buyers for the resultant materials and equipment.

Not only should there be a substantial market for parts to be used in repair and maintenance of ships needing repairs but there should be other markets which can be exploited. The Maritime Commission has done a lot along these lines since it was designated a disposal agency under the Surplus Property Board. The commission has sold 20,000 steel ships' bells to clubs, restaurants and other establishments and for installation in private residences. It has sold a large amount of navigational equipment for use for instruction purposes in yacht clubs and nautical schools. It has sold thousands of life rafts and floats for use in swimming pools and on beaches. It has sold large numbers of ventilating ports equipped with fans, for installation in kitchens and other rooms. It has many drum-type steel buoys for use as floats and net suspenders on beaches, also for use as water and oil containers.

In selling these items the commission has obtained high prices, often ranging from 70 to 100 per cent of the original cost. For instance, it has sold a large number of marine engines to dealers at cost less a commission discount. Large numbers of brass and cast iron ships' lights have been disposed of to dealers on the same basis for resale as hobby pieces.

Good Markets Expected

When overage, war-damaged and idle ships become available for sale in large numbers, there will be good markets for many more items on these ships.

Just when the commission will offer ships in quantity for scrapping and dismantling is not yet known. The number will be considerable; for instance, the commission has between 300 and 400 overage ships in operation at the present time, and some of these probably will be put up for bids shortly. Under the commission's policy, such disposal will be along planned lines and it will not sell in a volume at any one time that will permit flooding of the scrap or ship parts markets.

Tremendous Warehousing Program To Facilitate Plant Clearance

RFC discloses steps being taken for storage, warehousing and resale of vast quantities of surplus government-owned machinery, etc. Nine warehouses and storage areas established in lower Michigan alone

FIRST disclosure of detailed steps being taken by the Reconstruction Finance Corp. for storage, warehousing and resale of vast quantities of machinery, equipment, tools and materials made surplus by war contract cancellations was made last week in Detroit, with announcement nine warehouses and storage areas in lower Michigan, mostly in Detroit, are now receiving hundreds of millions of dollars worth of surplus which is being catalogued for resale and scrapping.

In June, 1944, RFC initiated conferences with lessees of DPC equipment to develop plans for plant clearance, the speed of which is vital to reconversion to peacetime production. Over the balance of the year agreements with the lessees for processing, removing and shipping equipment to warehouses were entered upon and funds appropriated in each instance to cover expenses involved. The Detroit office of RFC is one of 27 such agencies throughout the country but is considered the "hot spot" of the entire program because of the large volume of war manufacturing concentrated in the area. Hence this region is somewhat ahead of the others in activating plant clearance and is setting the pattern for other and smaller RFC disposal units.

Detroit Staff Expanding

Detroit staff of the RFC, occupying five floors of a building at 607 Shelby Street, is being expanded rapidly and shortly will have personnel of over 1000.

To supplement a plant clearance program properly, it was necessary to establish and carry out a large and varied warehousing program. The RFC declares it could find no available warehousing facilities of any type in extent sufficient to care for even a small portion of the required space. Since prompt action was imperative, it was decided against waiting for some government plant to become vacant (such as the Willow Run bomber plant now is) and using it for warehousing.

Therefore it was decided to develop open space into warehousing facilities to handle larger pieces of machinery and equipment, by the use of steel prefabricated buildings and temporary structures known as T. O. (theater of operations) Army warehouses. The prefabricated buildings are in units of either 100 or 200 feet long by 20 feet wide, and are placed over the equipment, processed for this type of storage and mounted on skids or dunnage, after it is deposited on the site. No floors are laid and experience thus far has been that damage from condensation has been negligible.

Nine storage areas established thus far are as follows: 68 acres in Highland Park, for machinery storage (former Ford tank proving ground); 76 acres in Ecorse, Mich., also for machinery storage; 93 acres in River Rouge, Mich.; 523,000 square feet of covered storage space and 880,000 square feet of open space at Russell and Ferry Streets in Detroit; a single-story building about 60 x 250 feet on Vinewood Street for storage of cutting tools and machine parts, with hundreds of bins already built to accommodate material now estimated to exceed $2.5 million in valuation; a four-story building on Bates Street, also for cutting tools principally, although it also includes a large display room for other equipment; a depot at Marysville, Mich., for storage of scrap aluminum, 90,000 sq ft of space in the Ford River Rouge plant; and 50,000 sq ft of covered space at AC Spark Plug Division in Flint.

Four more depots currently are being developed and it is believed likely more will be required. Nine depots now operated provide 6,400,000 sq ft of space and the four additional will add 2,000,000 sq ft more. Of the acreage now in operation, about 1,000,000 sq ft are the so-called T. O. warehouses in units 80 x 560 ft with cement floors, and 2,750,000 sq ft either in T. O. prefabricated shelters or set up for such shelters as soon as the equipment has been delivered. The T. O. warehouses will be used for termination inventories for the most part. In addition there are another 1,200,000 sq ft of closed warehouse space in heated structures.

To date, approximately 3200 shipments have been received at all warehouses, and facilities are available to receive approximately 66 per cent more surplus property than actually is being stored daily. Each depot is being prepared to operate on a receiving schedule of 24 hours daily if the occasion demands.

Detailed lists of all such materials, including raw materials such as semi-finished steel, are published regularly by the RFC disposal agencies and then circulated to the trade.

Further, it is hoped to move all warehoused stocks within a year, or else consign them to scrap, but this policy is not yet official, since it would appear wellnigh impossible to turn over all the tens of thousands of items available in 12 months. At least it is hoped to have all declared surpluses moved out of contractors' plants within 90 days, and even this is an ambitious program for a hastily expanded agency largely unfamiliar with the task involved.

As to surplus war plants themselves, the Detroit RFC agency has a list of 70 in lower Michigan, 45 of them self-contained and the rest largely special purpose units which can be converted to civilian production. The first of them was sold last week to Micromatic Hone Corp.

Negotiations are underway for sale of 20 of these self-contained plants under a formula of reproduction cost less depreciation. Most of them will be sold, it is believed, at a price of between $5 and $6 a square foot, this not including equipment of course.

Arthur J. Fushman, regional manager of the RFC, is quoted as forecasting between $600 and $700 million in surplus government-owned machinery and tools available for sale in the next 90 days in the Detroit area.

Potentially surplus aircraft in England are inspected by Thomas B. McCabe, third from left, liquidation commissioner for the Army and Navy, and other officials of the ANLC. Signal Corps photo from NEA

Impact of War's End Not Expected To Hit Alloys Particularly Hard

Alloying materials likely to be most heavily affected by war contract cancellations fall in so-called general steel group. Special steels, such as stainless, are seen finding wider application in postwar period

ALLOYS likely to be most heavily affected by war contract cancellations are ferrosilicon, standard ferromanganese, medium carbon ferromanganese, silicomanganese and high carbon ferrochrome, which fall in the so-called general steel group.

Those which should be less affected are the alloy steel alloys, such as vanadium, tungsten, columbium and certain others. Ferroalloy sellers believe that despite the further sharp cutbacks, especially in aircraft production, which have followed the termination of hostilities there will be an increasing demand for civilian purposes now that limitations are being lifted—a demand far in excess of prewar demand. This should be especially true of stainless steel sheets, and while special alloy deliveries in general may not be extended more, than a couple of months for some time to come, and even less for a while, it is to be recalled that deliveries for some time past, partly because of expanded capacity, have not been far extended.

Now that restrictions are being lifted on such raw materials as chromium, nickel and columbium, there will be many applications for stainless steel sheets and other forms of special alloys. Restrictions already have been eased and virtually complete lifting of all limitations should not be too far off.

Full Effect Not Yet Felt

The full effect of cancellations and those expected for the near future on September specifications will not be too greatly reflected for another few days, as consumers usually specify their requirements for the ensuing month during the last two or three days of the preceding period.

Production for the month now closing has held up fairly well, although affected to some extent by cancellations. However, the fact that producers could divert production to unrated work where rated requirements have been filled has minimized the effect of these cancellations.

With the war over a more comfortable position should develop shortly in metallurgical chrome ore. Until the very end there was a stringency in supplies.

The principal source of metallurgical chrome has been Rhodesia and the supply over past months would have been heavier had there been more ships. Turkey has followed next as an outstanding supplier. For a considerable time the United States bought heavily in Turkey, even though shipments were difficult, so as to preclude the movement of any heavy volume of chrome to the Axis powers. The better grades of the Turkish material thus purchased have since been skimmed off.

The particular trouble recently in getting further Turkish chrome is that Turkish producers have been "spoiled" by the high prices the Allies, and the United States in particular, were willing to pay just to keep the chrome out of enemy hands. However, with the war over there is reason to believe Turkish producers will soon assume a more reasonable attitude.

Some shipments have been coming in from Russia. However, this material hasn't found too ready acceptance among metallurgical users. The ore is said to be good chemically but not so good physically. About the only place where this ore is now finding an outlet is said to be in the manufacture of low carbon ferrochrome and even here it is not finding the application that it might for the reason that Russia's prices are considered high.

A little jag of metallurgical chrome is coming out of Brazil, and a little metallurgical chrome also is coming out of Cuba. However, the great bulk of Cuban ore is for refractory purposes and most of this country's supply of chrome for such needs in fact has been coming out of Cuba. Incidentally, this country's chemical requirements have been coming largely from the Union of South Africa. Some metallurgical chrome is now beginning to move from New Caledonia. Shipments from the Philippines soon should be resuming.

During the peak of the war some fairly good domestic chrome was developed as a result of premium prices, but not in any large volume. As needs became less acute, however, operations dwindled. At present some fairly sizable stocks of domestic chrome are said to be piled in Oregon and California.

TRANSITION TOPICS

RECONVERSION—Industry gets down to serious business of reconverting plants to civilian goods production. Many problems to be solved but fairly prompt resumption of normal activities expected. See page 69.

LABOR POLICY—Truman administration labor policy shaping up. Details remain to be worked out but recent statements of President and calling of management-labor conference show trend. See page 72.

WAGES—Guaranteed annual wage plan entered into by Wildman Mfg. Co. with United Steelworkers of America is said to be first of its kind in metalworking industry. See page 73.

SHIPBREAKING INDUSTRY— Suggestion of Admiral Land that a new industry be set up to dispose of surplus shipping arouses interest in scrap and steelmaking circles. See page 75.

SURPLUS DISPOSAL— Details of Reconstruction Finance Corp.'s plans for warehousing, storage, resale and other disposal of vast quantities of government-owned surplus machinery disclosed. See page 76.

SITE WELDING— Site welded steel frame farm buildings seen reality in the immediate future as result of experiments conducted by University of Wisconsin to determine functional requirements of dairy farm structures. See page 91.

SPECIAL STEEL SHAPES—The war added impetus to the creation of special steel shapes for welding. Total requirements believed to be substantial, while known demand awaits modification of certain angle, channel and semicircular shapes. See page 104.

EFFICIENT HANDLING— Great increase in capacity effected through efficient materials handling methods. Provide ideas which will be utilized to cut cost of storage, handling and processing in many plants. See page 108.

Many Phases of Good Neighbor Program Certain To Be Continued

Future of Office of Inter-American Affairs uncertain but privately sponsored centers for encouraging good will with Latin America are expected to continue agency's important domestic program

NO MATTER what final disposition is worked out by Congress or the administration for the wartime Office of Inter-American Affairs (up to last January known as the Co-ordinator of Inter-American Affairs), continuation of this agency's important domestic program appears assured. This is the program under which the co-ordinator encouraged creation of Inter-American Centers in strategically located cities throughout the country to obtain co-operation at the "grass roots" level.

These centers, under the guidance of Nelson A. Rockefeller, who resigned the post of co-ordinator to become assistant secretary of state, contributed greatly to development of the nation's new understanding of the importance of fostering good relations with the other American republics. They supported or organized classes in Portuguese and Spanish, arranged for lectures and the showing of motion pictures to educate local groups with reference to the living conditions and customs of the residents of the other Americas, and expended efforts in many other ways. In particular, they have received thousands of Latin American visitors in the best tradition of American hospitality, seeking not only to have them enjoy their visits, but also to give them information and make sure that the visitors were successful in accomplishing the purposes of their missions.

Centers Are Independent Groups

The centers from the beginning have been independent organizations operating upon their own initiative, and under the direction of state and local leaders. At the same time they have leaned heavily on the co-ordinator's office so as to mesh into the national program. The co-ordinator has provided them with printed matter, with motion pictures, with competent speakers and other services and, at times, has assisted them on a small scale with government funds in partial support of their activities. When, therefore, Congress last year reduced the co-ordinator's appropriation and it was announced that direct financial help would cease as of June 30, 1944, the centers had become well organized and it was the universal opinion among their members that the work thus under way should be continued permanently under private sponsorship.

Many individuals who had served in one capacity or another in promoting the good neighbor policy got together and developed a new private organization which, in February of 1945, was announced as the Council for Inter-American Co-operation. Its purpose, in the words of its chairman, Joseph C. Rovensky, formerly assistant co-ordinator of inter-American affairs under Mr. Rockefeller, is "to further economic, educational and cultural development in the western hemisphere through co-operation of the American republics." It will do this by setting up a "clearing house of inter-American thought and action at the national level," and proposes to work through affiliation with new and existing Inter-American Centers.

When the council was organized, Inter-American Centers had been established in 17 American cities—Buffalo, Cleveland, Hartford, Detroit, St. Louis, Akron, Memphis, Kansas City, Mo., Chicago, Boston, Philadelphia, Pittsburgh, Denver, Salt Lake City, Los Angeles, Raleigh, N. C., and Providence. Since then the organizational work has been pushed and four more full-fledged centers have come into being, at Louisville, Phoenix, New Orleans and Jacksonville. So far no trouble has been encountered in collecting funds to defray expenses, as a large number of manufacturers and others believe whole-heartedly in the cause and are glad to make contributions.

The main objective of the council, and the centers, is stimulation of trade between the United States and the other Americas. As conceived under the co-ordinator, genuine friendship and understanding, a true reflection of the good neighbor spirit, are seen as the intelligent approach in promoting trade relations. Hospitality, a knowledge of living conditions in the Latin American countries, acquaintance with their history, their industries and their resources, and a mastery of the Spanish and Portuguese languages are viewed as evidences that United States businessmen take the Latin Americans seriously and want to do business with them in ways that will help and please them.

For example, the Council for Inter-American Co-operation now is urging the Latin-American Centers to conduct investigations in their respective regions:

1—To determine what companies, not previously engaged in inter-American business, have lines of activity which promise success and which would contribute to the economic welfare of the American nations, and

2—To determine which other companies' entry into contemplated inter-

HANDS ACROSS THE BORDER: Co-operation among the Western Hemisphere republics, nurtured by the emergency, is expected to flower in the coming peacetime era. Trade which has been hampered by wartime restrictions, will increase, and scenes such as the one above, a prewar Pan American dinner, will appear more frequently. NEA photo

American business might be unsound, or detrimental to the reputation of regional business, and to advise these companies regarding the hazards, complications and difficulties involved.

In other words, companies will be encouraged to get into trade with Latin America when they have something useful do offer, or they will be urged to stay out of that trade when their participation threatens to give a "black eye" to American products and services in general. The theory is that few American companies, when policed in this way, are going to seek to exploit Latin American buyers.

To foster a better understanding of Latin American needs and preferences, a number of the centers are planning to send Good Neighbor Trade Commissions to the other Americas at the earliest date possible. These commissions will represent their particular areas and will be composed of "the most eminent and trusted citizens of their localities, probably including heads of heavy manufacturing and consumer industries, bankers, representatives of firms in position to make substantial imports, engineers, and also, it is hoped, eminent educational administrators capable of planning general and industrial education projects for young Latin Americans coming to this country."

Latin American Travel Urged

All of the centers urge their members to travel to the Latin American countries when possible, in the realization that the close contacts in such visits are the best means of acquainting United States citizens with the Latin American living conditions, customs and thinking.

Some of the centers, notably the one at Pittsburgh, now are toying with a proposal to make motion pictures of their areas, showing plants and products, living conditions, working conditions, etc., to be exhibited to interested audiences in Latin American countries. This idea now is being discussed for various refinements. For instance, it has been suggested that booklets be prepared in Spanish and Portuguese to be handed to the audiences as a permanent souvenir of the occasion.

Several centers regularly publish bulletins reporting activities and events of inter-American significance. They may have to do with a celebration of the birthday of Simon Bolivar, the great liberator and statesman, progress in constructing the new steel plant in Brazil, installation of hospital facilities in Peru, etc. Some members of the St. Louis center have asked for extra copies of these bulletins to be sent to their Latin American customers and friends. For this purpose the bulletins will be expanded to carry articles in Spanish and Portuguese, and to carry more business information.

Entertainment of Latin American visitors was carried to unusual lengths in two states during the past year. The Connecticut State Development Commission, in one instance, and the New York State Department of Commerce, in the other, took the visitors by automobile and private car to the leading cities and gave them unusual opportunities to become familiar with typical local institutions, business concerns, and industrial plants. Results in both cases were highly productive of good will and of business opportunities, and even of some definite contracts booked. There has been a large amount of discussion about these trips in the other areas and similar trips will be arranged by the Inter-American Centers in those other areas in the future.

The centers are beginning to develop a close relationship to the Inter-American Development Commission, the clearing house for development commissions in each of the American republics. By working closely with the United States Commission of Inter-American Development, these centers hope to keep their members fully advised with respect to business planning in the Latin American republics over the long future.

To fill the present dearth of salesmen with a knowledge of Spanish and Portuguese, and familiar with Latin American customs, the centers at present are all actively interested in the problem of training such men.

Some of the centers of late have become disturbed over the fact that many Americans fail to understand that if we are to sell our products abroad we will have to import products in exchange. Some of them are now in the stage of planning broad educational courses, and specific import programs.

These exhibits, according to reports to the Council, already are being viewed by approximately 100,000 persons a month. Incidentally, more than 200,000 persons monthly are seeing pertinent motion pictures shown under the auspices of the centers, and some 60,000 individuals a month are attending dinner and luncheon discussion meetings arranged by the centers. Of printed matter the centers are distributing about 60,000 pieces monthly.

To show the range of business interest in the Council for Inter-American Co-operation, the names and connections of some of its moving spirits are as follows:

Orson Adams Jr., vice president, First National Bank of Boston; Warren H. Atherton, recent national commander, American Legion; W. Randolph Burgess, vice chairman, National City Bank, New York; James B. Carey, secretary-treasurer, Congress of Industrial Organizations; William L. Clayton, assistant secretary of state; William A. M. Burden, assistant secretary of commerce; Percy L. Douglas, International Division, Otis Elevator Co., New York; Don Francisco, vice president, J. Walter Thompson Co., New York; Berent Friele, president, American Coffee Corp., New York; Henry Grady, president, American President Lines, San Francisco; Horace R. Graham, president, Anglo-Chilean Nitrate Co., New York; Edgar J. Kaufmann, president, Kaufmann Department Stores, Pittsburgh; Eugene P. Thomas, president, National Foreign Trade Council Inc., New York; Thomas J. Watson, president, International Business Machines Corp., New York; Leo D. Welch, president, Standard Oil Co. of New Jersey, New York; George F. Zook, president, American Counsel on Education, Washington; Charles J. Stilwell, president, Warner & Swasey Co., Cleveland; Jack I. Strauss, president, R. H. Macy & Co. Inc., New York; John A. Stevenson, president, Penn Mutual Life Insurance Co., Philadelphia; Edward Reilly, overseas manager, General Motors Corp., New York; Robert J. Watt, international representative, American Federation of Labor, Washington; Very Rev. Msgr. Frederick G. Hochwalt, National Catholic Welfare Conference, Washington; Dr. Harold W. Dodds, president, Princeton University.

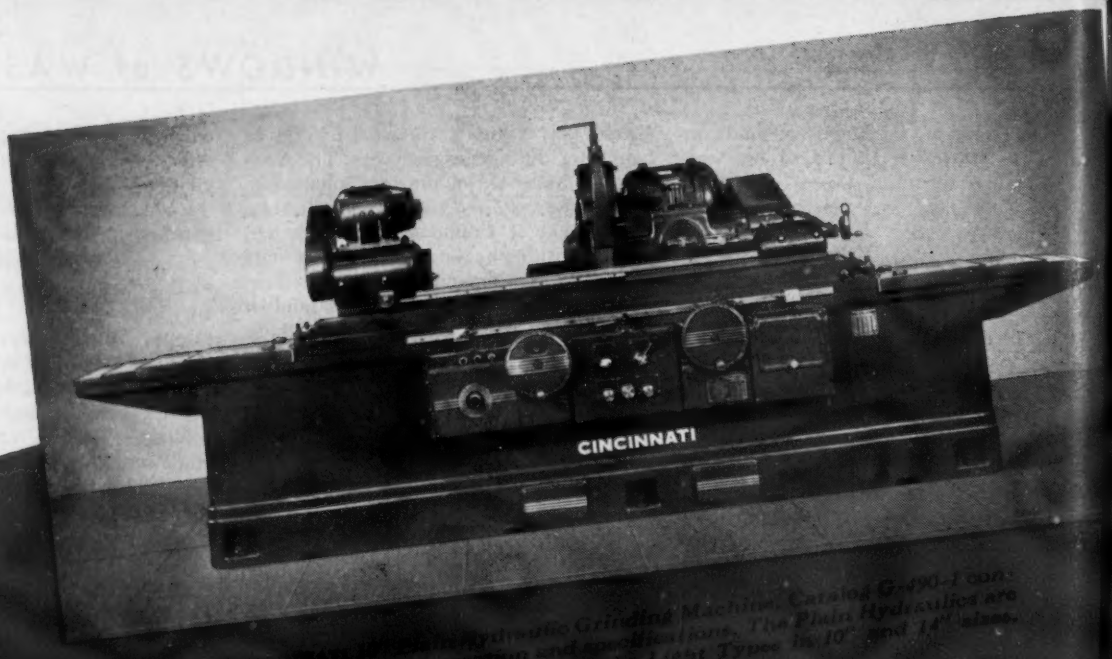
The Council for Inter-American Co-operation Inc. has its headquarters at 30 Rockefeller Plaza, New York. Its director is Raymond T. Rich. Mr. Rich, head of Raymond T. Rich Associates, New York, was a member of the staff of the Co-ordinator of Inter-American Affairs, Washington, and still serves the Office of Inter-American Affairs in a consulting capacity.

BRAZILIAN STEEL

The Volta Redonda steel plant, largest steelmaking plant in Latin America, is almost ready to begin production, according to advices to the United States Department of Commerce. Located about 80 miles west of Rio de Janeiro, Brazil, the plant has been pushed steadily to completion despite wartime supply difficulties.

A battery of 55 coke ovens, capable of producing 1200 tons daily, is awaiting coal. A blast furnace, boiler house and power house have been completed. Three open hearths are scheduled to be ready in September. A blooming mill is scheduled for operation in November. The rail and structural mill will go into production early in 1946 and the sheet and tin mill about the middle of next year.

When completed the plant will have capacity to produce 350,000 tons of steel a year, about 150,000 tons more than all of Brazil's prewar production.



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Here's a pertinent question to ask your maintenance men and shop supervisors: How long do the grinding wheel spindle bearings last in your precision grinders? They might say, "Well, that all depends upon the finish and accuracy I want, and how hard I 'push' the machine to grind heavy stock removal jobs." If you have CINCINNATI's with FILMATIC Spindle Bearings in your shop, then their answer would be, "I don't know how long the bearings will last, for they have never given me any trouble." ¶ That's the FILMATIC record everywhere, for they have been giving trouble-free service on CINCINNATI Grinders as long as eight years. They are bearings with an enviable past, and a bright future, for FILMATICS just never quit regardless of what they're called upon to do. All CINCINNATI Grinders are now equipped with FILMATIC Bearings, and you have a wide choice of these efficient and productive machines.

Centertypes—4", 6" and 10" Plain Hydraulic, 10" and 14" Light Type Plain Hydraulic, 14", 16", 20", 24" and 28" Plain Self-Contained; 12", 14", 16" and 18" Hydraulic Universals.

Centerless—Nos. 2, 3 and 4, and Centerless Lapping Machines.

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CINCINNATI 12" x 36" Hydraulic Universal Grinder. The Hydraulic Universals are available in 12", 14", 16" and 18" sizes. Catalog G-456-1 contains specifications for the 12" Grinder, and Catalog G-471-1 for the 14", 16" and 18" sizes.

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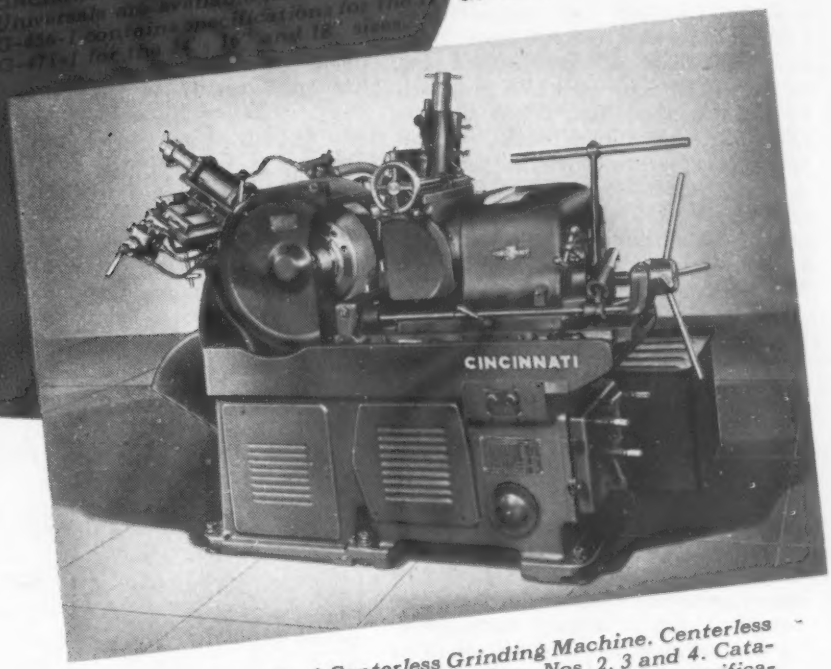
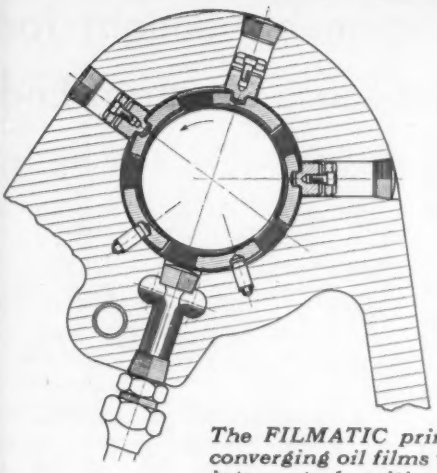


CINCINNATI No. 2 Centerless Grinding Machine. Centerless Grinders are available in three sizes, Nos. 2, 3 and 4. Catalog G-456-2 contains complete information and specifications. Sweet's Catalog File gives a brief description of all CINCINNATI Grinding and Lapping Machines.



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Liquidation of Practically All War Agencies Expected Soon

Only War Production Board, Office of Price Administration and a few other groups will be continued to carry out important reconversion work. Truman orders removal of controls as soon as possible "without endangering" the economy

ALL emergency war agencies which are not essential to the attainment of a high rate of civilian goods production or to the maintenance of economic stability will be liquidated as rapidly as possible, it was indicated last week.

Those which had wartime functions, such as the Office of Civilian Defense and Office of Censorship, already have terminated their operations. Other agencies, including the National War Labor Board whose functions have peacetime applications, will be absorbed soon by old federal departments. A few, such as the War Production Board and the Office of Price Administration, will remain active for an indefinite period to perform important reconversion and postwar duties. WPB's Aircraft Division and Office of Utilities have been discontinued, however, and additional divisions will be dropped.

In an executive order issued Aug. 18, President Truman ordered the war agencies to remove price, wage, production and other controls as fast as possible "without endangering" the economy. In calling for vigorous, concerted and uniform action on the part of the entire government, he made the following principal points:

Any civilian production bottlenecks should be corrected promptly through use of priorities assistance; prices should be raised only to correct inequities or to alleviate hardship; the cost of living and the general level of prices must not be allowed to rise; pay increases may be granted so long as they do not affect commodity prices.

The program, intended to create a sound economy, will be co-ordinated by John W. Snyder, director, Office of War Mobilization and Reconversion. This agency, created by Congress to co-ordinate the war effort and to direct the task of shifting the nation from a war to a peacetime footing, is not due to expire until June 30, 1947, and undoubtedly will be continued longer if necessary. The elimination and merging of war agencies into regular departments will be under the direction of Mr. Snyder.

Future of the principal war agencies is estimated as follows:

Office of War Information will be closed within six months. Office of Economic Stabilization likely will be consolidated soon with the Office of War Mobilization and Reconversion. Office of Defense Transportation has started liquidation, having ordered the closing of 48 of its field offices within 30 days, and will shut down completely as soon as remaining travel and a few other restrictions are lifted.

War Manpower Commission is scheduled to be disbanded and its United States Employment Service will become a part of the Labor Department or of a proposed Welfare Department which may have cabinet status. War Labor Board will continue to handle wage and labor problems during the early part of the reconversion period but its functions will be carried on soon by the Labor Department. Committee on Fair Employment Practice will be continued through next June on a reduced budget.

War Shipping Administration will be discontinued soon and its affairs will be taken over by the Maritime Commission. Foreign Economic Administration may be absorbed within a few weeks by the State and Commerce departments. Office of Scientific Research and Development will be liquidated soon, but many of its functions may be continued under a proposed national research organization.

Smaller War Plants Corp. is expected to be shifted soon by Congress to the Commerce Department. Office of Alien Property Custodian may be continued for several years to handle seized property, patents, etc.

R. L. Sentner Named Deputy Director of Steel Division

Richard L. Sentner has been appointed deputy director, Steel Division, War Production Board, succeeding Harry M. Francis who recently resigned to return to American Steel & Wire Co., Cleveland. A. A. Archibald succeeds Mr. Sentner as assistant director for production and chairman of the Production Directive Committee. M. B. McCafferty of Cleveland has been appointed deputy assistant director in charge of production while Claude R. Grabeel of New York city has been named secretary of the Production Directive Committee. George L. Anderson of Worcester, Mass., has been appointed deputy chief, Carbon Bar and Semifinished Branch and M. M. Chapman of Pittsburgh as deputy chief of the Sheet and Strip Branch.

Albert M. Orme has been named director of the Safety and Technical Equipment Division, WPB, succeeding Howard H. Frank who is returning to private business.

New Financial Arrangements Sought for Foreign Trade as Lend-Lease Program Ends

LEND-LEASE program under which this country has shipped more than $40 billion worth of weapons, food and equipment to the United Nations was terminated last week. The United States has received as reverse lend-lease about $5 billion worth of supplies and services.

Lend-lease shipments will continue to move for a time, however, since many millions of dollars worth already are on order and for which financial arrangements have been provided. United States and foreign economic authorities are now trying to determine how urgently needed new orders are to be financed.

American officials say that termination of the lend-lease program must be followed by quick moves to make credit available to foreign purchasers, mainly through the Export-Import Bank, in order to avoid economic disturbances and consequent political unrest abroad.

President Truman's letter of notification, dated Aug. 20, to Allied nations that the program has been terminated involved these steps:

The granting of straight lend-lease supplies is stopped immediately and no more requisitions for such supplies are being received.

Requisitions on which contracts had been placed by the United States government will be filled for those countries which have made special agreements for continuing to receive the supplies on a credit basis. This affects particularly France, Belgium and the Netherlands.

A two-month period is granted during which countries may make requests for more supplies, provided they put payment "on the line." This means that foreign purchasers may have the help of the Foreign Economic Administration in placing orders here.

Economic representatives of foreign countries are invited to confer with American officials on post-lend-lease arrangements.

The principal lend-lease countries are Britain, Russia, France, Belgium, the Netherlands, and China. Russia has no special agreement for tapering off supply shipments.

Belgian officials in Washington are reported as saying their country had pro-

vided $120 million of reciprocal lend-lease supplies and services but had received from the United States only $40 million out of a total of $140 million worth requested.

Outstanding contracts for lend-lease goods for France total about $450 million. In addition the French have placed $260 million of United States-approved requisitions for which no contracts have been let. The French are running 40 high-priority trains daily for redeployment of American troops, supplying 4000 acres of storage space and turning over to our Army practically all the country's main hotels.

Aside from unplaced and uncontracted requirements for a large volume of needed goods, the French are covered by an economic agreement made last February providing: Such items as short-life machinery, food and oil would be furnished them on lend-lease until that program ended; then the same items would go to them on credit with payments to span a 28-year period. Long-life materials such as locomotives, ship and heavy industrial equipment, already are going to the French on a 28-year credit with 20 per cent down payment on delivery.

Commerce Department Lists Patents for Licensing

The public register of patents established June 1 by the Department of Commerce now has about 300 patents listed and others in process, all of which are available for licensing or sale, according to a department announcement.

This service was inaugurated, the department said, to aid manufacturers in finding new products for manufacture during reconversion or in future. The National Patent Planning Commission, a semi-official body, recommended creation of this registry. Negotiations have been started with respect to several of these patents, the department indicated, and at least one has been consummated.

Many applications for listing on the register have been filed by small makers or inventors possessing one to several patent grants, but several large corporations are reported to have made inquiries concerning the register and the department expects that they will become active participants at a later date.

Cast Iron Tube Radiation Prices Lifted 8½ Per Cent

Manufacturers' ceiling prices for cast iron tube radiation have been increased about 8½ per cent, effective as of Aug. 22. This action, taken by Office of Price Administration in an amendment to price schedule No. 272, will raise manufacturers' maximum prices by about 2½ cents net per square foot.

Patent Office Is Custodian of Inventions Considered Fantastic in Prewar Years

"THE PATENT Office at this moment is the custodian of inventions that only a few years ago belonged in the realm of fantasy," says Conder C. Henry, assistant commissioner of patents, in *Domestic Commerce*, Department of Commerce monthly, for August.

"With respect to the metals, there seems to be a trend toward the increased use of powdered metallurgical processes. Many articles having complex shapes are being quickly, conveniently, and satisfactorily produced from powdered metals. Also, there are trends toward the continued development of lighter, stronger, and more easily workable metals for transportation purposes; of heat, creep and corrosion-resistant metals for power generation, such as jet-propulsion engines and internal-combustion turbines; and of processes for reducing low-grade ores."

PATENT RESEARCH

Old patents, open to public use, are being combed for reconversion ideas, Patent Office reveals.

Many manufacturers and trade groups are reported searching old Patent Office files for product ideas. All available patents, dating back to 1836, except recent issues on which the 17-year protection provided by patent laws still applies, are being searched for such inspiration it is stated. The file from 1890 to 1936 was destroyed by fire, it is recalled.

Sales of patent copies in the 1944-45 fiscal year have not been tabulated but are known to exceed the 4,190,730 copies, exclusive of subscription and exchange copies, which was the total for the previous fiscal year.

For the improvement of the airplane, continues Mr. Henry, there will be simplification of variable pitch controls for the smaller craft and the use of combustion turbine in planes of high power to drive oppositely rotating pitch propellers, the turbine exhausting as a jet-propulsion device.

"There will also be adaptation of electronic devices for synchronizing the speed of the engines and for control of the throttle, supercharger, ignition, and propeller pitch. The plane of peace will be of much greater speed, capacity, and safety than were achieved before or during the war. A definite trend in this respect is toward the adoption of jet-propulsion. Dramatic advances in electronics are now in definite prospect. These will be recorded in the mechanical, chemical and electrical arts.

"New developments in the area of ultra-high frequency, now principally for military activities, will be available shortly in the fields of television and for the betterment of transportation by water, air and rail. Radar can be and will be devoted to the promotion of both speed and safety in these methods of transportation. With the increase in velocity there grows the necessity for security. It is, for instance, essential that the nature of the terrain over which a plane flies be known regardless of the weather or visibility. Radar would be capable of assuring that information."

Mr. Henry also tells about inventions involving substitutes for metals. Machines have been developed, he says, for the quick production of hollow building blocks, filaments and large-diameter pipes, all of glass. Inventions also cover glass in the manufacture of plumbing fixtures, chemical pumps, and plug gages. Multiple, bulletproof glass has been incorporated in airplanes and tanks. Certain articles of kitchenware for years fashioned only from metals, he says, are now being manufactured of glass.

He tells also about pending patents covering household refrigeration. There will be domestic refrigerators designed to provide one or more chambers for maintaining packages of food at temperatures below 32 F and others for storage at from 40 to 50 degrees. As an auxiliary of low temperature in preservation of food there will be added violet-ray sterilizers which may be enclosed in refrigerators to prevent bacterial growth that may result despite refrigerating temperatures in spaces occupied by food.

"There are in course of development," says Mr. Henry, "small liquefied fuel systems that enable a householder in a village or rural section to use ranges, water-heaters and other items of the same general patterns as those serving residents of large cities where gas is obtainable from central plants. Another combination is that for heating a residence or other building in winter and cooling it in summer."

Price Control Eased on Minor Consumer Goods

Price control has been removed from a number of consumer goods items that do not enter significantly into the cost of living, Office of Price Administration announced recently. Included are sales of a number of jewelry items, sports equipment items, toys selling at retail for 25 cents or less, cigarette lighters, pipes, some photographic apparatus, clothespins and notions.

FOR GREATER CAPACITY IN THE SAME HOUSING BORE

BEARINGS: HYATT

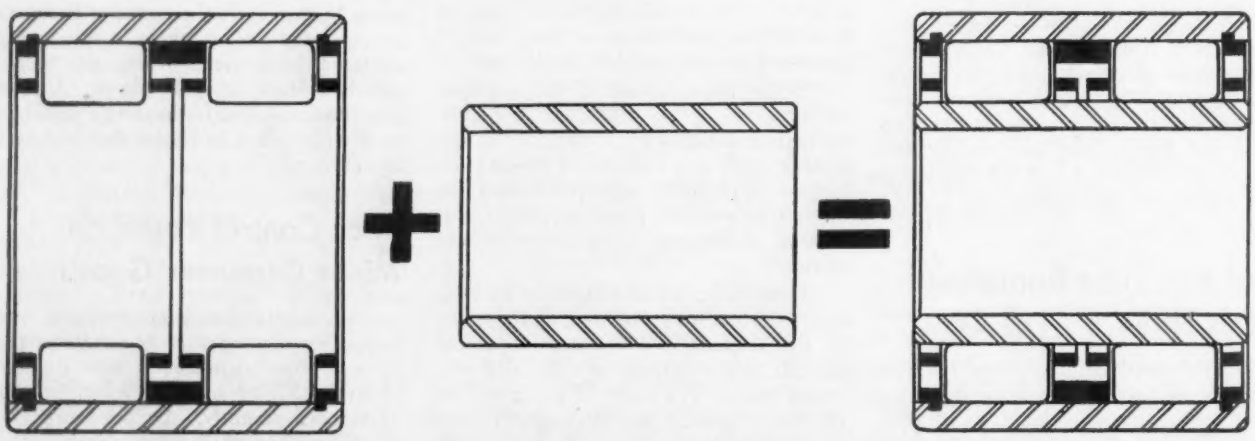
In the light series we provide a roller bearing of the same high precision as others in the Hy-Load range but in addition twice the load capacity of single row bearings of the same shaft diameter. It's the A-6200-TS "Duplex" type bearing with double roller assembly.

The component parts of this bearing are freely interchangeable. That is any inner race will fit any roller assembly of the same piece number—thus facilitating product assembly and disassembly.

This bearing like the other separable inner race bearings in the Hyatt Hy-Load line can be used with the inner race omitted and the rollers operated directly on a hardened and ground shaft.

Look into the Hyatt Hy-Load bearing application advantages—three types—separable inner and outer race—self-contained—and the double roller assembly.

Bulletin covering all types upon request.



HYATT BEARINGS DIVISION • GENERAL MOTORS CORPORATION

Harrison, New Jersey · Chicago · Detroit · Pittsburgh · Oakland, California

By A. H. ALLEN *Detroit Editor, STEEL*

MIRRORS of MOTORDOM

Scene in motor capital best described as one of confusion. Sudden ending of war presents auto builders with many new problems which will take time to solve. Mutterings from union labor serve to cloud the outlook

DETROIT

SOME months ago there filtered into this area via Chicago, news of a befuddled organization of business, industrial and professional men parading under the cryptic title of CAIC. When it became known that every member was president, and the group's initials connoted, "Cripes Am I Confused," there was a wholesale rush to join and don membership lapel pins. Events of the past ten days have enlisted new thousands, which is perhaps the briefest and most accurate way to describe the Detroit scene at the moment.

Confusion will predominate the outlook for the next few weeks and at the present time it is next to impossible to elicit even an occasional official opinion which might point the way to something like normalcy. No one will even hazard a guess, preferring merely to ask for another CAIC pin instead.

Requests for comment from General Motors and Chrysler officials have drawn nothing but constrained silence. Mr. Ford has already made his views clear, on the occasion of his recent birthday. George T. Christopher of Packard says his company has no definite information as to specific requirements for final needs on war contracts for Rolls-Royce aircraft engines, marine engines and spare parts for each. However, present indications point to a complete stopping of war production except for a limited quantity of spare parts and restricted marine engine production, and some time will be required to determine exact requirements and invoice parts for these requirements. About a week ago, it may be recalled, Packard announced engine backlogs of close to $500 million.

Sixty-Day Order Backlog

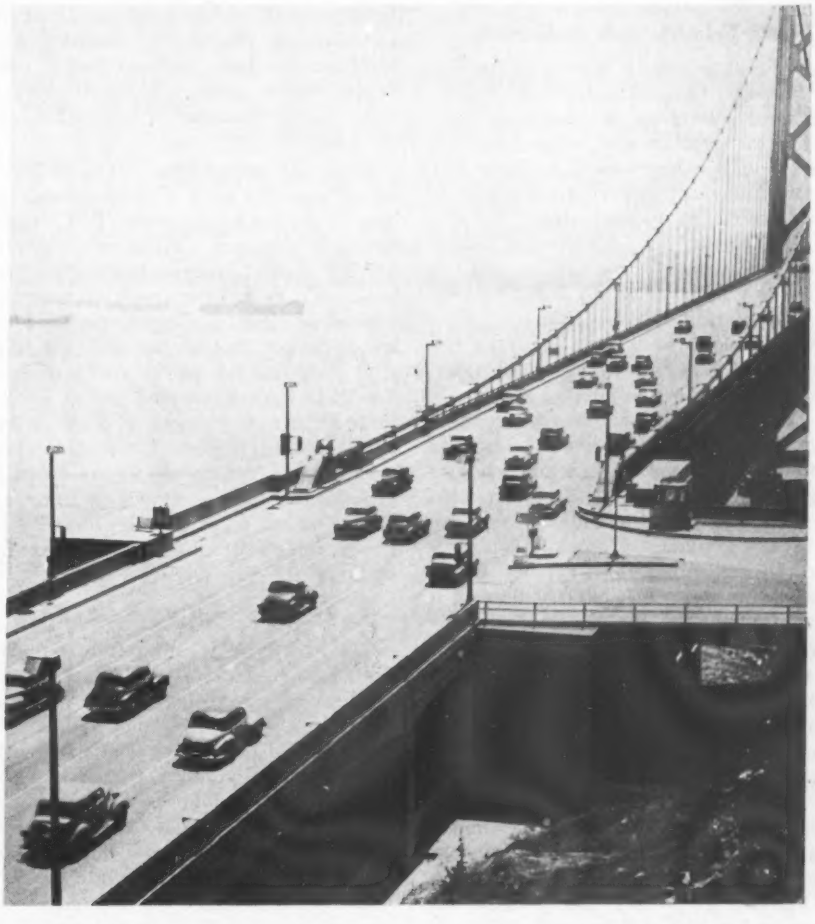
Further, Mr. Christopher estimates not over 10 per cent of the present working force will be required to handle remaining work of supplying necessary materials on all contracts, and this work can be completed in about 60 days.

A. E. Barit, president of Hudson, says the first 1946 model passenger cars will be rolling from his plant before Aug. 30 and production schedules will be increased as rapidly as additional materials can be shipped in. This contrasts with trade reports Hudson output started last week on the basis of five cars daily. Mr. Barit's comments were in the form of a letter to stockholders and he said the company had lifted its production sights by entering the market for additional automotive materials to the tune of $40 million. Looking to future roseate automotive markets, the Hudson president pointed to estimates of at least 6,500,000 prewar cars being "off the road" by the end of the year, while more than 9,500,000 cars now being driven have value of $100 or less and normally would be in junk yards.

Removal of wartime production controls and cancellation of military contracts will enable Studebaker to resume passenger car production early in October and to attain higher levels of manufacture in the last quarter than had been authorized, notes K. B. Elliott, vice president in charge of sales. Initial assemblies will be the Champion model, lowest priced of the Studebaker series, for the reason the engine used in this model has been in continuous production throughout the war. The Champion will be new in appearance and feature improved riding qualities. It will be offered in four body styles — two-door and four-door sedans and two coupe models. The sales program will be discussed with dealers early next month.

Unofficially, but on the basis of parts schedules, General Motors has upped its projected passenger car program to 400,000 by Feb. 1. This compares with about 150,000 authorized in this period under original WPB schedules. Assuming a running start by Oct. 1, the GM division assemblies would figure to something like 70,000 in October, 90,000 in November, 110,000 in December and 130,000 in January. Using 40 per cent as the GM share of total industry output, passenger car production might shape up to 175,000 in October, 215,000 in November, 275,000 in December and 325,000 in January. Add to this a truck production over the balance of this year of around 400,000 and the automotive industry will be accounting for over 1,000,000 truck and passenger car units by Jan. 1.

Talk these optimistic figures to any automotive production official and he



SUNDAY DRIVERS: Immediately after announcement of the lifting of gasoline restrictions, automobiles in the San Francisco Bay area had their tanks filled and the Bay bridge was swarming with joy riders. NEA photo

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will cross his fingers while saying, "Yes, that is, if we can keep the plants going." Mutterings from union labor leaders are growing louder, one condemning the Michigan Unemployment Compensation Commission for alleged lack of facilities and slow processing of unemployment claims, another proclaiming that the no-strike pledge terminated on Wednesday, Aug. 15, another serving demands on General Motors for a 30 per cent increase in wages of 300,000 workers covered in a UAW-CIO contract, another serving similar notice on Chrysler Corp.

Walter P. Reuther of the UAW-CIO, served the demands on General Motors and stipulated an appropriate part of the increase should be used to achieve uniform wage rates throughout various plants of the corporation, regardless of geographical location, and a further share amounting to 3 per cent of the total payroll should be set aside in a "social security fund" to be administered by the union. Selection of the figure of 30 per cent was determined by the reduction in take-home pay which hourly workers will suffer by virtue of a return to the 40-hour week.

Wants Industry-Wide Conference

Mr. Reuther went a few steps further and proposed General Motors take the initiative in calling an industry-wide conference to negotiate such wage increases on an overall industry basis, so there will be no problem of jockeying for competitive position in the situation. In the event of such a conference being scheduled, demands on GM would be withdrawn in favor of an industry-wide demand by the UAW—CIO.

No comments have been made on the proposals by either GM or Chrysler. Some observers are wondering how much Mr. Reuther might settle for, since it is accepted union technique to ask for everything and settle for a fraction. As a guess, an increase of 5-10 per cent might be possible, providing in return there was a guarantee of individual productivity returning to the point where it stood in 1941. The latter, however, is a most important proviso and probably one which the union would be powerless to effect, to say nothing of measure.

Meanwhile, the long lines gather daily at offices of the Michigan Unemployment Compensation Commission and the United States Employment Commission to file claims for compensation and to review available job openings. The latter are few and mostly out of the state. Maximum compensation claim allowable is $28 for 20 weeks, but average has been under $20 and for well under 20 weeks. The current reconversion holiday — and that is all it will be for many thousands — probably will extend the length of some payments, but the inner circles of the industry are showing no undue alarm over possible extended idleness. They know the bulk of layoffs already has been made (around 200,000) and the only direction now to go is up. The only question is how soon, and the estimates vary from 60 to 120 days.

On the production front, indications point to early introduction by Ford of an automatic transmission of completely new design, similar to the Hydra-Matic transmission developed by General Motors, but reportedly far simpler in design. Those who have seen some of the blueprints say the number of parts in the Ford design has probably been cut in half from the Hydra-Matic total.

It would appear doubtful the new Ford transmission could be ready for installation on 1946 models, and therefore would be deferred until next summer when the first of the 1947 line appears. No indication is given whether it will be applicable to the entire Ford line or only to the higher-price Lincoln and Mercury models. The mechanism has been under development for a considerable period, with Mr. Ford himself taking an active part in consultations.

According to equipment interests, the unit will be built, initially at least, by the Detroit Gear Division of Borg-Warner Corp., at one time known as the Detroit Gear & Machine Division. An extensive program of machine tool purchases has been laid out and is now in the active stage. Subcontracting a unit of this character is somewhat unusual for Ford.

There has been a steady flow of DPC-owned machine tools over recent months from automotive plants to RFC warehouses in this area. These are machines which contract terminations have released and for which operators have expressed no desire to buy. Little has been known about what happened to the tools after they left the plants, but last week the RFC took a selected group of the press on a tour of some of these warehouses where this surplus machinery is being stored, apparently in the effort to demonstrate how assistance is being extended to war contractors on the troublesome problem of disposing of unneeded equipment.

Briggs Aircraft Plant Offered

Briggs Mfg. Co.'s aircraft turret plant on East Outer drive, a 330 x 1141-foot masonry, windowless, airconditioned structure on a 33-acre tract of land, has been offered for sale by RFC. Facilities include office building, personnel building, salvage building, gun-test range, power substation and five guard houses, in addition to the main factory, machinery and equipment. While the RFC will entertain bids from interested parties, it is believed likely Briggs will be the eventual buyer, already having made a bid, since the property would tie in nicely with its adjacent plant on the Eight-Mile road where prior to the war a wide assortment of autobody components was produced. Conceivably the former turret plant could be easily adapted to manufacture of complete bodies and might well absorb older facilities in the present Meldrum and Vernor plants operated in the heart of the city by Briggs.

With ceilings off on truck production and all producers setting their immediate sights on an unprecedented production level for trucks of around 100,000 units monthly, it is interesting to note results of a survey of truck registrations recently completed by R. L. Polk & Co., showing a decrease of only 2.9 per cent during the period 1941-1944, comparing with a mortality of 12.9 per cent in passenger cars over the same interval. Figures show truck registrations last year of 4,419,891, decrease of only 131,835 from 1941. The low mortality is explained by the fact some production of civilian units has been possible during the war and further that many trucks have been continued in use far beyond the time they normally would have been junked. Average truck on the highway now is 7½ years old.

United States Rubber Co. has turned tire production facilities from war to peace and within 30 days will increase passenger car tire production by 33 per cent, reaching prewar levels by yearend and moving on up to a point 30 per cent beyond, employing an additional 40 per cent.

All government controls on production of new automobiles and trucks in Canada were lifted Aug. 17. Munitions Minister Howe, who announced the lifting of the restrictions, said, "From now on, manufacturers of cars and trucks will be limited in their output only by the availability of supplies and their own ability to accelerate production."

At the same time he cautioned that the restrictions on distribution of new cars and trucks remain in force and that dealers still are required to allocate vehicles to essential users.

He also said that while no restrictions on the importation of automobiles and trucks from the United States exist, it is doubtful whether U. S. plants will have many to spare for some time to come, and these too will be rationed to essential users.

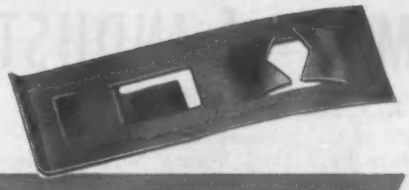
Voluntary No-Duplication Purchasing Policy Lauded

Curtis Mfg. Co., St. Louis, has been commended by the War Production Board for voluntarily adopting a purchasing policy designed to prevent indiscriminate duplication of unrated purchase orders.

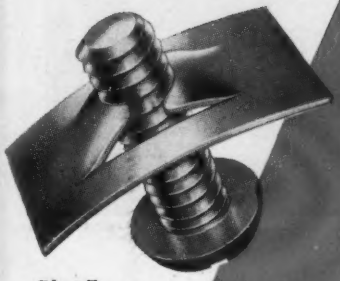
The Curtis Co. pledged that any of its orders will show specific delivery information and exact quantities; and will represent definite requirements for the production schedule. Such orders will not be subject to withdrawal or cancellation except for causes beyond the company's control.

Push-On

Latching Type



SPEED NUTS *for* Better Automotive Assembly



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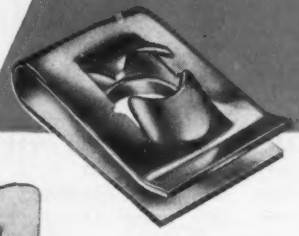

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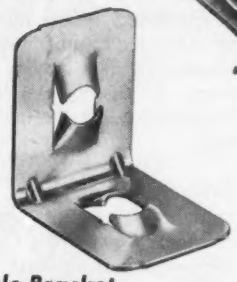
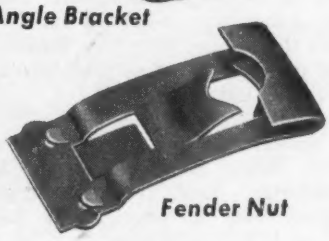
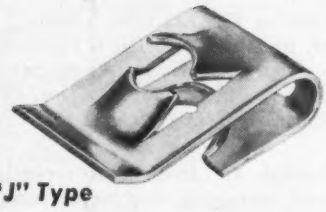


Angle Bracket



Fender Nut



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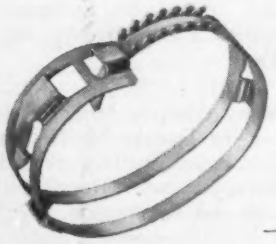

Hose Clamp

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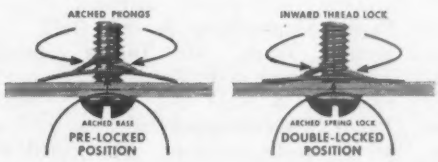

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FASTEST THING IN FASTENINGS

MEN of INDUSTRY

R. A. Lewis is retiring as general manager of the Bethlehem, Pa., plant, Bethlehem Steel Co., effective Sept. 1. He will continue in a consulting and advisory capacity. **J. M. Sylvester** has been appointed general manager and **A. D. Shankland,** engineer of tests, will succeed Mr. Sylvester as assistant general manager. Mr. Lewis entered the employ of Bethlehem in 1907 as assistant master mechanic of the Bethlehem plant. In 1916 he was made general superintendent of the Lehigh Division and in 1918 general manager of the Bethlehem plant. Mr. Sylvester has been with the company since 1914 and for several years was in charge of proof-firing of all foreign ammunition. In 1917 he became superintendent of the projectile departments and in 1920 also was named superintendent of forge shops. Three years later Mr. Sylvester became superintendent of forge shops and foundries, and was made superintendent of the Lehigh Division in 1927. He has been assistant general manager of the Bethlehem plant since 1936. Mr. Shankland began his work with the company in 1914 in the chemical laboratory. Through successive steps in the organization he was advanced to superintendent on Nos. 1 and 3 open hearths in 1925. He was placed in charge of the Lehigh mill in 1928 and in 1934 was appointed manager of tests.

—o—

A. L. Meyer, Wynnewood, Pa., chief of the Steel Plate Section, Steel Division, War Production Board, Washington, has resigned after more than three years' service, to return to Great Lakes Steel Corp., Detroit. Mr. Meyer has been appointed assistant eastern manager of sales, representing the Great Lakes company in the Philadelphia and New York areas.

—o—

Richard W. Emmerling has been elected a vice president, Charles Dreifus Co. Inc. at Philadelphia. Mr. Emmerling has been connected with that company for the past eight years.

—o—

W. H. McCormick has been appointed chief metallurgist of the Park Works, Crucible Steel Co. of America, Pittsburgh. Mr. McCormick has been associated with the company for 17 years and during the war period was in charge of the numerous armament steels produced at the Park Works.

—o—

V. O. Lowry has been appointed general plant superintendent, Greenville Steel Car Co., Greenville, Pa. He has been serving as assistant to **W. S. Dietrich,** general manager, since joining the company in October, 1943.

—o—

Robert F. Moyer, Rumford, R. I., has been elected president and treasurer, Asa S. Cook Co., Providence, R. I. **Arvid N. Larson** has been named general manager and **R. S. Crosby,** who served as manager of the company for the past 47 years, will continue as consultant. **A. Edwin Lundwall,** Cranston, R. I., is vice president in charge of production; **C. E. Grosser,** Warwick, R. I., vice president in charge of engineering; **William E. McCabe,** Providence, secretary. The newly elected officers will hold like positions with the Standard Machinery Co., Providence, to which company's plant the Cook company has moved its equipment. **Stanley H. Rose** is export sales manager, and has offices in New York.

DR. R. C. GIBSON

A. J. ZABER

—o—

Dr. Robert C. Gibson has joined the Tanner Chemical Co., Ferndale, Mich., and will serve as vice president in charge of research.

—o—

Frederick H. Parkin has returned to his former position as manager of the sales department, William M. Parkin Co., Pittsburgh, after completing four and a half years of service in the armed forces.

—o—

Otto F. Seidenbecker, who resigned recently as vice president, Wisconsin Steel Co., Chicago subsidiary of International Harvester Co., has become associated with Chicago Steel Service Co., Chicago, as assistant to the president. His headquarters are in the company's newly established downtown office at 332 South Michigan Avenue.

—o—

O. A. Tucker has been appointed vice president and general manager, Everett Pacific Shipbuilding & Dry Dock Co., Everett, Wash. Mr. Tucker formerly was president and general manager, Pacific Iron & Steel Co., Tacoma, Wash. **James N. Cunningham** has been promoted to works manager. He joined the company in December 1943 and for the past six months has been assistant works manager.

—o—

Henry B. Ahlers has been named an assistant on the staff of **Ralph C. Stuart,** vice president in charge of Lamp & Lighting Divisions, Westinghouse Electric Corp., Pittsburgh. **Dr. Albert Brann** was named manager of the division's specifications and standards department, and **Paul B. Tully** was appointed assistant manager of lamp manufacturing. These men will make their headquarters in Bloomfield, N. J. **Edward H. Frank** has been appointed office manager for the Lamp Division's northwestern district headquarters in Chicago. He succeeds **George A. Olsen,** who has joined the Westinghouse Electric Supply Co. in Milwaukee.

—o—

A. J. Zaber has been placed in charge of all manufacturing and engineering operations of the Gray-Mills Co., Evanston, Ill. Prior to joining that company, Mr. Zaber was associated for 14 years with the Modine Mfg. Co., Racine, Wis., the past four years as plant manager at LaPorte, Ind.

—o—

Morvin Thomas, for the past several years district sales manager in Chicago, Pittsburgh Steel Co., Pittsburgh, resigned from that position Aug. 15.

—o—

Charles E. Dixon Jr., chemical engineer, formerly with Turco Products Inc., Los Angeles, has been appointed vice president and general manager, Western Division, Phillips Chemical Co., Chicago.

—o—

Adolph G. Hochbaum recently was named managing director for exports to U.S.S.R. and general sales representative for central and eastern European countries, Baldwin Locomotive Works, Eddystone, Pa.

—o—

H. LeRoy Whitney, formerly technical consultant to Donald M. Nelson, War Production Board, has been elected chairman, Intercontinental Distributors Inc., New York and Washington.

—o—

Maurice C. Taylor, formerly manager of research at the Niagara Falls Laboratories, Mathieson Alkali Works, New York, has been appointed resident director of research and development. Other re-

E. G. CROSS

M. I. DORFAN

L. J. CHATTEN

search department changes are: **J. Douglas MacMahon** has been named assistant to the technical director; **C. N. Richardson** becomes manager of research engineering; **C. Gerald Day** is research and plant liaison engineer.

—o—

E. G. Cross has been appointed supervisor, production planning and control department, Crocker-Wheeler Division, Joshua Hendy Iron Works, at Ampere, N. J. Mr. Cross's business career has included executive positions with California Shipbuilding Corp., Wilmington, Calif.; Pacific Aviation Inc., Los Angeles; Given Machinery Co. Ltd., Los Angeles; and Western Pipe & Steel Co., San Pedro Shipbuilding Division, San Francisco.

—o—

Clarence L. Williams has joined the Foxboro Co., Foxboro, Mass., as a sales engineer, and will have his headquarters in the company's New York offices.

—o—

Charles W. Anklam recently was appointed executive assistant to the president, **A. B. Hartz,** C. M. Hall Lamp Co., Detroit. **Thomas P. Cusack Jr.** has been named sales promotion manager of the company.

—o—

James Creese, vice president, Stevens Institute of Technology, Hoboken, N. J., has been elected president, Drexel Institute of Technology, Philadelphia.

—o—

Wilfred Thompson is in charge of the Detroit office, Bullard Co., Bridgeport, Conn., succeeding his father, the late **F. Archer Thompson.**

—o—

E. A. Lofquist, until recently on active duty as a captain in the United States Navy, has been appointed a special representative in the sales department, American Car & Foundry Co., New York. Mr. Lofquist will have his headquarters at the company's Chicago office.

—o—

E. M. Schultheis, in charge of automotive equipment sales, Detroit office, has been appointed manager of automotive sales, Clark Equipment Co., Buchanan, Mich. **Leo A. Bixby** has been named manager of engineering for the Automotive Divisions. **Charles H. Warner,** who has served during the war as a major in the office of chief signal officer, Intelligence Section, and on the combined chiefs of staff, has been named manager of the Washington office.

—o—

Morton I. Dorfan has been appointed manager of the Dust & Fume Engineering Division, American Foundry Equipment Co., Mishawaka, Ind. Mr. Dorfan has been associated with Allis-Chalmers Mfg. Co., Milwaukee; Blaw-Knox Co., Pittsburgh; and Pangborn Corp., Hagerstown, Md.

—o—

W. L. Holst, Chicago; **J. M. Rowland,** Dayton, O.; **Frederic A. Leisen,** Detroit; and P. D. Pearson Co., Milwaukee, have been appointed direct mill representatives for the Rigid-Tex Corp., Buffalo, in their respective districts.

—o—

George L. N. Meyer has been elected president, George J. Meyer Mfg. Co., Cudahy, Wis., succeeding his father, the late **George J. Meyer. George T. Meyer** is vice president.

—o—

L. D. Whitescarver, formerly general assistant sales manager, Lynn, Mass., has been named sales manager of the newly organized Fitchburg, Mass., section, Turbine Division, General Electric Co. **L. E. Newman,** Turbine Division, Schenectady, N. Y., succeeds Mr. Whitescarver at Lynn.

—o—

Paul Kofmehl recently was named mechanical engineer, Salkover Metal Processing, Chicago and Long Island City, N. Y.

—o—

Keith Williams, president, Pratt & Letchworth Co. Inc., Buffalo, has been named to the Civic Full Employment Committee by the mayor of Buffalo.

—o—

Earl A. Taylor has been named general works manager, Automotive Division, Crosley Corp., Cincinnati. Mr. Taylor joined the Hudson Motor Car Co., Detroit, in 1942 as works manager, after 17 years' service with Yellow Coach & Truck Co., Pontiac, Mich.

—o—

Louis J. Chatten, who has been appointed vice president and general commercial manager, North American Philips Co. Inc., Dobbs Ferry, N. Y., recently resigned as director of the Radio & Radar Division, War Production Board, Washington.

—o—

Dr. Benjamin S. Garvey Jr., has been appointed technical service manager on rubber chemicals, B. F. Goodrich Chemical Co., Cleveland.

—o—

James S. Wilson has been advanced to manager of plastics equipment sales, Watson-Stillman Co., Roselle, N. J.

—o—

E. J. Schulenberg, formerly with the Sangamo Electric Co., Springfield, Ill., will be general manager, Time-O-Matic Co., which is erecting a new plant in Danville, Ill.

—o—

Carl G. Nesbitt, formerly sales manager of the household line, Continental Can Co., New York, has been appointed manager of war products sales.

—o—

M. G. Ivandick has joined the engineering staff, Aro Equipment Corp., Bryan, O.

—o—

Burrell S. Manuel, Los Angeles, vice president, Westinghouse Electric Supply Co., has been presented the Order of Merit of the Westinghouse Electric Corp., Pittsburgh.

—o—

Miles Lamb, city engineer at Belvidere, Ill., has resigned to become manager of the sewage engineering department, Chicago Pump Co., Chicago.

—o—

F. E. Smith has joined the Vesuvius Crucible Co., Pittsburgh, as sales and service engineer. Mr. Smith was employed during the past 12 years by

J. F. CONE

Newly appointed to purchasing post, Youngstown Sheet & Tube Co., Youngstown, STEEL, Aug. 20 issue, p. 117.

R. F. NELSON

Who is vice president, R. G. LeTourneau Inc., Peoria, Ill., as noted in STEEL, Aug. 20 issue, p. 117.

ELLIS HUNTER

Who is president-elect, British Iron & Steel Federation, as noted in STEEL, Aug. 20 issue, p. 116.

Republic Steel Corp., Cleveland, at its Canton and Chicago district plants, and with Crucible Steel Co. of America, New York, at its Atha, N. J. works.

—o—

Col. Alfred E. Howse and **Lt. Col. Earl Kribben** have resigned effective Sept. 1 as administrator and assistant administrator, Surplus Property Board. **Lt. Col. Victor Sachse** has been appointed assistant general counsel of the board, and **Hugh B. Cox**, general counsel.

—o—

William C. Dickerman Jr. has been appointed vice president in charge of engineering and manufacturing, Milton Mfg. Co., Milton, Pa.

—o—

Earl C. Allmand recently was appointed general manufacturing manager, of plants in Piqua, O., and Grand Rapids, Mich., Lear Inc. **Calvin Brunner,** formerly plant superintendent at Grand Rapids, has been named plant manager.

—o—

C. C. Fish has been elected president, Shelby Metal Products Co., Shelby, O., succeding the late **W. W. Van Horn.** Mr. Fish formerly was vice president and has been associated with the company since 1920.

—o—

James V. Winkler has joined the Los Angeles staff, Dow Chemical Co., Midland, Mich., as development engineer. He formerly was in charge of experimental engineering at the company's magnesium fabrication laboratory, Bay City, Mich., and has been with the Dow Chemical Co. four years.

Barlow Brooks, formerly manager of sales and development, Kinkead Industries Inc., Chicago, has joined the Reynolds Metals Co., Louisville, Ky., as division manager to direct its recently organized Finished Formed Shapes Division.

—o—

Henry I. Guy, assistant manager, Transportation Divisions, General Electric Co.'s Erie Works, has retired after more than 40 years' service with the company. **F. H. Craton** succeeds Mr. Guy as assistant manager.

—o—

Thomas B. Conlon, vice president, Conlon Corp., Cicero, Ill., manufacturer of home laundry equipment, has resigned to establish his own manufacturing and merchandising organization in the same field.

OBITUARIES . . .

Eli Joseph, 69, formerly vice president of Joseph Joseph & Bros. Co. with offices in Cincinnati and New York, died in Cincinnati recently.

—o—

Edward M. Gerry, 73, a sales engineer in the electrical department, Allis-Chalmers Mfg. Co., Milwaukee, died Aug. 11 in that city.

—o—

Otto Swanstrom, 71, president and founder, Diamond Calk Horseshoe Co., Duluth, died in that city recently.

—o—

Lloyd S. Burdick, 37, a district representative for the Caterpillar Tractor Co., Peoria, Ill., was killed Aug. 9, in a train accident in North Dakota.

—o—

Charles W. Hoffman, 53, manager of the expediting department of the Allis-Chalmers Mfg. Co. plant at Springfield, Ill., died in that city Aug. 14.

—o—

C. J. Hackett, 82, former vice president, American Brass Co., Waterbury, Conn., died Aug. 13 in Kenosha, Wis. He became manager at Kenosha in 1910 and retired as vice president in 1931.

—o—

B. A. Froemming, 43, head of Froemming Bros. Inc., Milwaukee, died Aug. 15 at his home in that city.

—o—

Henry L. Guenther, 71, owner of Angelus Sanitary Can Machine Co., Los Angeles, died recently at his home in that city.

—o—

Justus R. O'Brien, 55, vice president, Ingersoll-Rand Co., New York, died recently in that city.

—o—

Leon B. Brewster Sr., sales engineer, W. W. Sly Mfg. Co., Cleveland, died Aug. 20 in Pittsburgh.

—o—

Leo B. Brabant, 64, president and founder, Brabant Brass Mfg. Co., Detroit, died recently.

—o—

Leonard B. Hall, 61, manager of manufacture, Central District, American Can Co., New York, died Aug. 17, in Oak Park, Ill. He had been associated with the company since its organization in 1901.

—o—

William M. Cawthra, 56, manager of the pattern department, Acme Pattern & Machine Co. Inc., Buffalo, died recently.

—o—

Anthony J. Bressan, 67, patent attorney for Westinghouse Electric Corp. at Jersey City, N. J., died Aug. 16 in that city.

—o—

Charles E. Shultz, 34, president and founder, Heyer-Shultz Inc., Montclair, N. J., died recently.

—o—

Hubert E. Mills, 60, secretary-treasurer, Alabama Mining Institute, and associated with the institute 32 years, died in Birmingham Aug. 19.

—o—

William L. Behm, 54, general manager, United Iron & Metal Co., Pittsburgh, died at his home in that city Aug. 17.

Steel-Frame Farm Structures To Be Welded on Site; Big Market Seen

Experiments being conducted by University of Wisconsin and Carnegie-Illinois Steel Corp. stress functional requirements Program expected to build up acceptance of steel in agricultural buildings

SITE welded steel frame farm buildings will be a reality in the immediate future.

Experiments are being conducted by the University of Wisconsin to determine the functional requirements of dairy farm structures through a grant from Carnegie-Illinois Steel Corp., subsidiary of U. S. Steel Corp. In addition, Carnegie-Illinois is developing farm structures to meet the functional requirements. One of those developments is the site welded system of steel frame building construction. This is a method for assembling steel frame structures by site welding the framework from mill length materials.

This type construction is expected to be nearly competitive pricewise with other construction in most farm areas, and may offer greater functional utility and extend the life span of the building. In comparing relative costs of different type construction, however, the deciding factors depend on the trend in the respective values of the different materials involved, the amount of materials needed, and overall labor costs in relation to the time element in completing the job. In connection with the site welded steel construction procedure, it is pointed out that only 65 minutes are required to weld 25-foot span trusses, capable of carrying the load of a 12-foot bay section.

Welders soon will be able to receive farm building plans from Carnegie-Illinois Steel Corp., free of charge, that will instruct them how to construct steel or a combination of wood, steel and other building materials for frame buildings of the size and kind that have in the past been constructed of other construction materials. These plans will be used as a pilot program to help build up the acceptance of steel through helping the contractor work out the right combination of steel and other building materials in the proper ratio in order to construct the best possible structure for the lowest cost.

The plans for the buildings will be limited to those structures that have a span from 24 x 44 feet. Smaller buildings will likely be prefabricated or framed of other types of materials.

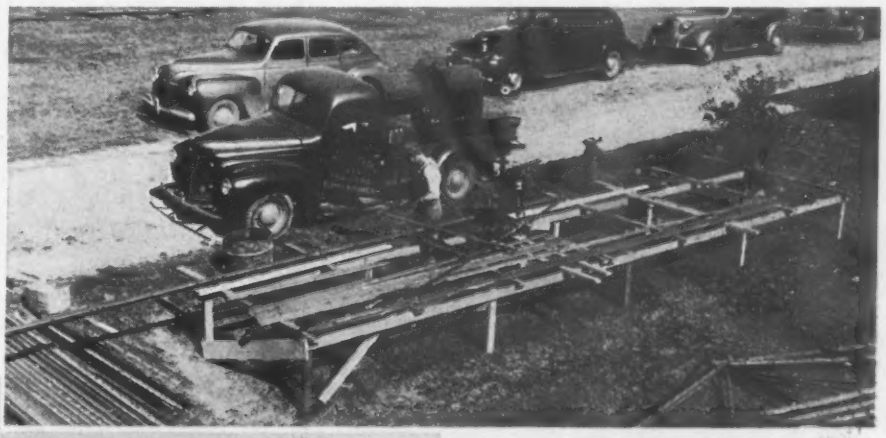
Site welded system of construction enables local building materials dealers to stock and handle mill size angles, plates, structurals and sheets because of the small number of sizes needed for complete stocks. The lengths can be cut locally.

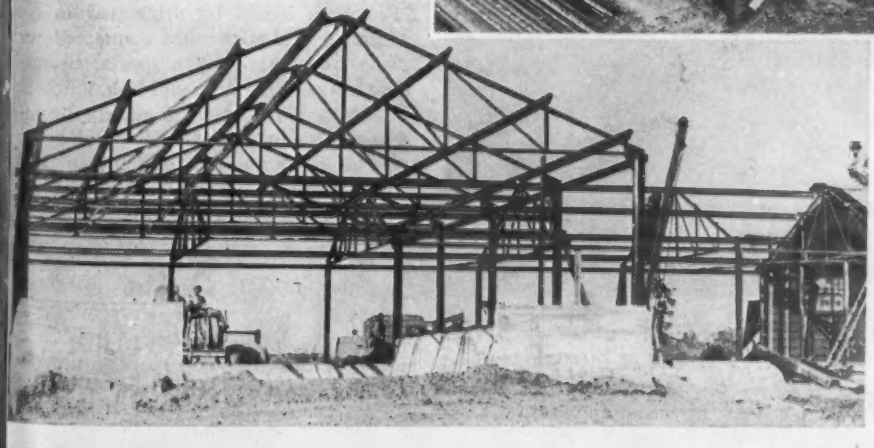
The structural mill sections used in the construction plan prepared by Carnegie-Illinois Steel Corp. are the following: Angle roof truss and struts, 1½ x 1½ x ⅛ inches; angle roof truss and window sill, 2 x 1½ x ⅛ inches; 4-inch H-beam at 10 pounds, column; 5-inch channel at 6.7 pounds, roof purlin for 12-foot span; 3½ x 2½ x ¼-inch angle, eave member; 3-inch channel at 5 pounds, roof purlin for 8-foot span; and 2½ x 1½ x ⅛-inch angle roof truss for 40-foot span. From these seven mill sections plus two plate sizes, one story steel frame buildings with clear spans ranging from 24 to 40 feet can be built. These spans cover a large number of building requirements, for the urban as well as agricultural areas.

This new type construction is believed to be a constructive forward step in meeting the estimated $2 billion annual farm building requirements for the early postwar years. It is generally conceded that there is considerable room for improvement in the design and locations of farm building structures to more adequately serve the functional requirements involved. Present tendency is to mechanize the handling of feed and other items on a much greater scale than in the past. The overall objective is to improve the layout of farm structures to save steps, plus the energy required to accomplish the job.

On the basis of huge demand for farm building construction and the expected general acceptance of the site welded steel construction in conjunction with other materials, it is believed that a new market for structural steel will develop, conservatively estimated at about 50,000 tons annually for the early postwar years with a potential of nearly half a million tons a year.

In addition, this type construction should be an important factor in creating jobs and utilizing the abilities of a large portion of the 1.5 million persons who have had some training in welding and flame cutting techniques.





Above is shown all the shop required for site fabricated welded steel frame structures. The table was built in one hour. Portable electric welder and a flame cutter are about the only additional equipment needed other than that for ordinary construction work. At the left is shown a framework all site welded. Bolts were used to anchor the columns and studs to the foundation. Nearly all the materials used were precut

WING TIPS

System for television and FM radio broadcasting from airplanes flying six miles above earth developed by Westinghouse. Will increase range of television and lower costs. Martin developing high-flying, low-speed planes for system

POSTWAR plans for a new system of television and FM radio broadcasting from stratosphere airplanes cruising six miles above the earth are being developed by Westinghouse Electric Corp., Pittsburgh.

Initial flight tests of the system, to be known as "Stratovision," may be made this fall. If it is successful, Westinghouse engineers say, coast-to-coast television and FM broadcasting would be made possible at reasonable cost and these services could be broadcast to the most remote areas soon.

The Stratovision system was originated by C. E. Nobles, 27-year-old Texas-born Westinghouse engineer, who also has several radar developments to his credit. The system was developed further by the Westinghouse organization in cooperation with the Glenn L. Martin Co., Baltimore.

Advantages of the system are described by Walter Evans, Westinghouse vice president in charge of radio activities, as follows:

"Television and FM radio waves travel in a straight line and for all practical purposes stop at the horizon. This means that television broadcasts from the highest practical tower erected on the ground cannot be received much more than 50 miles away.

"The Stratovision system simply puts the antenna and transmitter in an airplane flying in lazy circles 30,000 feet above the earth, out of sight of human eyes. The shortwaves sent out from this airborne antenna would blanket the earth's surface like a great inverted ice cream cone; covering an area 422 miles across or equal to about the combined area of New York, Pennsylvania and New Jersey.

"Reception of Stratovision broadcasts would be practically free from interference and distortion, caused normally by reflected ground waves and the numerous amplifications or relaying stages required by any previously proposed system to carry television and FM broadcasts over a comparable area."

Supporting the claim that the Stratovision system is the most economical one yet proposed, Mr. Evans disclosed the startling fact that as the height of a television or FM antenna is increased the amount of power required to deliver a usable signal to a receiver is sharply reduced.

"To provide a usable signal throughout a 422-mile-wide receiving area covered by a plane-borne transmitter 30,000 feet in the sky," he said, "would require only one-fiftieth as much power as is needed by a 50-kilowatt transmitter on the ground covering an area only 100 miles in diameter."

The Stratovision system would employ a low-powered ground transmitter to send television and FM broadcasts to a specially-designed high-altitude plane circling slowly overhead. The plane would be equipped with receivers and transmitters for rebroadcasting these programs back to the earth.

"As now conceived, the plan would employ four television and five FM transmitters on each plane," Mr. Evans pointed out. "This combination, however is predicated only on economy of operation and could be changed at will without altering technical aspects of the system."

A coast-to-coast network for relaying television and FM programs from plane to plane between New York and Hollywood would simply require stationing eight such stratosphere planes above strategic areas spanning the continent. "To provide comparable service by ground installation," Mr. Evans estimated, "would require approximately 100 costly relay towers and hundreds of transmitters; or a coast-to-coast coaxial cable network which is estimated to cost at least $100 million."

Suggested Relay Points

The eight planes in the Stratovision relay system would fly over New York, Pittsburgh, Chicago, Kansas City, Curtis, Neb., Leadville, Colo., Salt Lake City and Los Angeles, linking logical talent centers in New York and Hollywood. By adding more planes over Durham, N. C., Atlanta, Memphis, Dallas, Sacramento and Portland, Oreg., it would be possible to provide Stratovision coverage for 51 per cent of the nation's area and 78 per cent of its population.

"All elements of the system have been proven beyond doubt," Mr. Evans said. "Early experiments show that the system is completely workable in any of the several television and FM frequency allocations which were recently announced by the FCC. Operation improves, however, in the high frequencies and this means that the system will hasten the day of practical color television."

Discussing details of the system, Mr. Nobles, its young creator explained: "Programs would be originated in conventional ground studios connected with plane transmitters by a special beamed-type ultra-shortwave radio link, much like those used in radar. Similarly beamed plane-to-plane connections would be employed to form the nationwide high-altitude relay network.

"Present plans call for conventional all-metal, low-wing monoplanes — almost as large as the famed B-29, but with gross weight only a third of the Superfortress. They would have automatic pilots, turbo-superchargers and supercharged cabins. Each plane would have a wing spread of 161 feet and weigh about 20 tons fully loaded."

C. E. Nobles, center, originator of the Westinghouse Stratovision system, discusses the development with Walter Evans, left, vice president of Westinghouse, and William K. Ebel, vice president of Glenn L. Martin Co., which is developing the planes to carry the television and FM broadcasting apparatus

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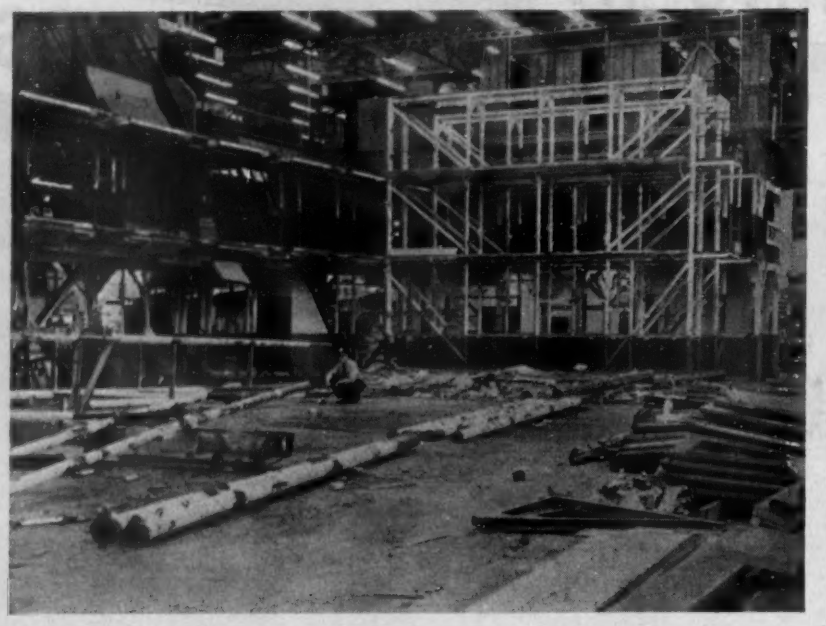

CUTBACK: Workers dismantle huge jig used in making B-17 bomber parts at Lockheed Aircraft Co.'s Burbank, Calif., plant. Company's contracts have been cut back sharply. NEA photo

Secret Radar Bombsight Details Revealed As Japanese Victory Lifts Censorship

MILITARY censorship has lifted the veil of secrecy from "Mickey," the famous radar bombsight used by the Army Air Forces to destroy Nazi industries, transportation, fuel and military installations. Details of how "Mickey" operates are offered by Philco Corp., manufacturer of this airborne radar equipment for the Army and Navy.

"Mickey" made possible successful bombing through clouds of the German coastal defenses along the Normandy beach just 30 minutes before H-hour. This airborne radar guided the American bombers which destroyed 1,500,000 tons of German oil supplies in a single mission. Devastation of Hitler's aircraft and ball bearing factories in 28 days of concentrated pinpoint bombing is another typical accomplishment.

Operationally, it is a quadruple-threat weapon, used in Allied bombers both for offense and defense.

Offensively, "Mickey" gives a bomber crew "eyes" that can pierce the overcast or darkest night and spot targets more than 100 miles away. When the radar-equipped bomber approaches a selected target, special attachments on the "Mickey" enable the bombardier to concentrate his radar picture on the specific target area and determine the precise bomb release point. As a result, the radar not only locates the target, but tells exactly where in its flight the plane must drop its bomb-load to score a direct hit. For several months, this Philco-built airborne radar has been used with the Norden bombsight in bright daylight, as well as in bad weather or at night.

Defensively, "Mickey" also serves two vital purposes. Used in conjunction with land radar beacon stations near the bomber's airfield, this airborne radar provides the plane's navigator with a simple, accurate course to and from the target area. Thus a bomber can fly a direct course in bad weather or darkness, without wasting gasoline or time. Also, the "Mickey" picture tube immediately shows the presence of unfriendly enemy aircraft within radar range. Thus the bomber crew is promptly warned when enemy fighters are approaching, and can frequently take evasive action or be prepared to shoot down attackers.

"Mickey" accomplishes these four functions of target location, bomb direction, navigation and antifighter warning by utilizing the basic radar principle with numerous modern improvements. Briefly, the "Mickey" radar transmitter sends out super-high frequency radio waves through a special antenna. These radar waves travel at the speed of light, 186,000 miles per second, and are reflected from buildings, bridges, railroad tracks, ships, rivers and other objects in the terrain below the bomber. The reflected waves return to the bomber's radar receiver almost instantaneously and are translated electronically into a complete illuminated map which appears on the screen of a large tube like the picture tube in a home television receiver. By flipping a switch, the plane's radar operator can make his radar map cover a large radius. Or, if he wants to see targets in more detail, he can switch in a split second to ranges of 50, 30 or even 5 nautical miles.

Typical ground targets, such as an enemy bridge or munitions plant, appear as bright spots on the radar picture tube and are easily identified by their shape and position on the radar "map." Lakes, rivers or the ocean produce darker images on the radar screen.

New Long-Range Bomber On the Way Several Years

Long-range heavy bomber mentioned but not identified by Gen. H. H. Arnold in his post V-J Day comments on the future of airpower and airborne weapons probably is the 6-engine B-36 whose birth dates back several years. At the time the Nazis had over-run Europe and the blitz on England made her survival look precarious, military experts in this country concluded they might have to fight a war from bases entirely within this country or from nearby possessions such as Alaska, Hawaii, etc. which meant a critical need for a bomber with cruising range of about 10,000 miles, or cruising radius of upward of 5000 miles.

Designers went to work at once on the B-36, which was calculated to fill this need. Its wingspread was in excess of 200 feet and it was planned to install six 3000-horsepower engines with ample fuel capacity for long range operations. It was to be built by Consolidated Vultee, builder of the B-24 Liberator and the later B-32 Dominator. Engineering and design work were pushed, but slowed down somewhat as the German onslaught wore off and the enemy was gradually pushed back.

Two other planes, similarly in the preliminary design stages, are the XB-35, purportedly a large multi-engine bomber of the Northrop Flying Wing type, and the XB-42, Douglas pusher-type high-speed two-engine attack bomber. With the advent of jet propulsion, all may have recently been redesigned to incorporate some of the turbojet developments. It is not believed any have gone beyond the drawing board stage.

A new fighter airplane which is in the production stage but about which little has been made public is the Ryan Aircraft Corp.'s jet-propelled Fireball fighter being produced for the Navy. Some assemblies have been made at the Ryan plant in San Diego, and efforts are being made to triple present production by November, after which output will level off. Presumably aircraft cancellations will not affect this project, since it is still experimental in nature.

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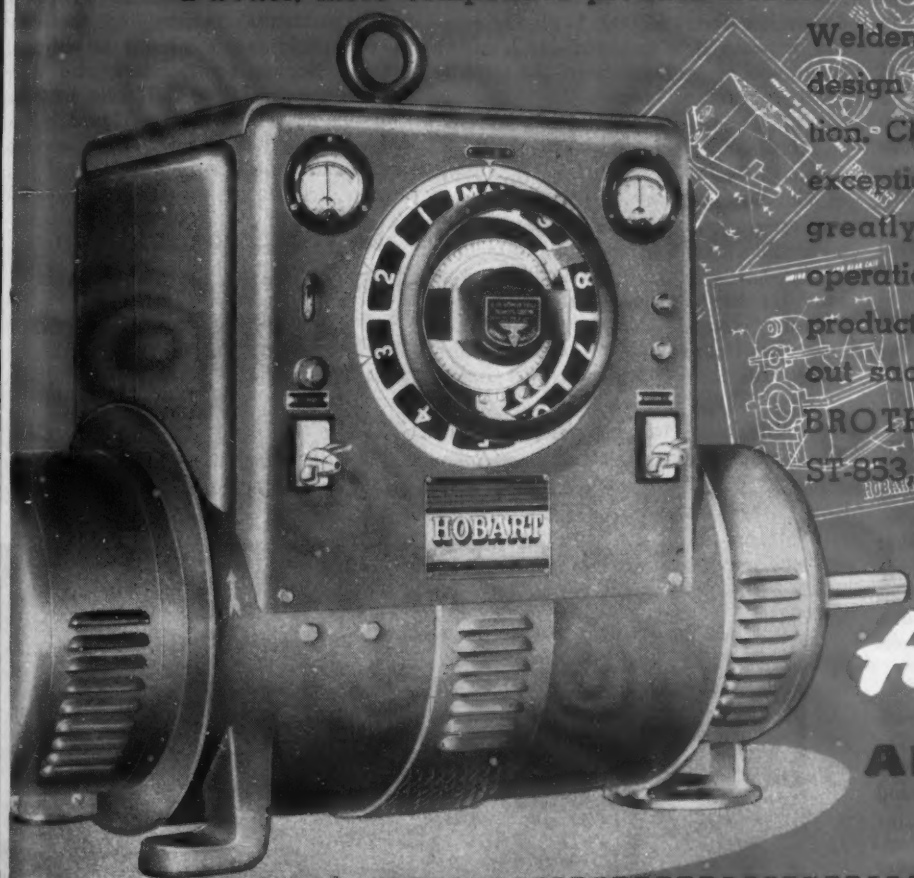

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Pacific Northwest Industry Hit By War Contract Cancellations

Sudden ending of Japanese war intensifies transition problem in district. Considerable temporary unemployment expected. Continuance of some shipbuilding, ship repair and other war work to cushion shock

SEATTLE

SURRENDER of Japan, coming with unexpected suddenness finds industry in this area unprepared for the adjustments to conform with government cutbacks. Already the Navy ship construction program has been sharply curtailed. It is expected considerable unemployment will ensue until management has had time to survey the situation and outline a postwar program.

At the Tacoma plant of Todd Pacific Shipyards Inc., work has been stopped on seven Navy ships on the ways and two whose keels were to be laid in September and October. However, work will continue on five carriers at the Tacoma yard while two destroyer tenders under construction at the Todd Seattle plant will be completed here. A gradual reduction of 2000 employees a month is the program at Tacoma for the next nine or ten months. According to the latest estimates of 20,000 workers at the Todd Tacoma yard this schedule would liquidate the working force by next June.

At the Seattle Todd repair plant there is ample work for many months and it is expected it will be employed to capacity indefinitely. No immediate reduction of working forces at the Puget Sound Navy yard is anticipated, according to officials, as much repair work is on hand and scheduled for the future. Many major jobs are to be handled here.

Plants Switch to Repair Work

Other Seattle plants have been gradually converting to ship repair work as construction contracts terminated.

Construction cancellations at Portland total in excess of $100 million and include eight aircraft escort carriers scheduled to be built at the Kaiser Vancouver yard, eight AP5 transports and nine Victory cargo ships at Oregon Shipbuilding Corp., five tankers at Swan Island and five C4 transports at Vancouver. Yet to be completed are 38 hulls in various stages. Eight C4 transports will be completed at Vancouver to aid in returning military personnel from the Pacific. Other vessels will be completed as freighters. Work on hand includes four AP5 transports and nine Victories at Oregon Ship while Swan Island still has nine tankers to build.

Kaiser management announced that with about 60,000 men and women on its payrolls, wholesale termination is not anticipated and work will be spread as much as possible to cushion the effects of cancellations.

Summary of the Portland situation indicates work on hand and immediately available will keep ship plants occupied to the end of the year. From the peak of 125,000 shipyard workers last year, Portland employment in that industry has now shrunk to 80,000 of which Kaiser has about 65,000. With the coming of peace it is expected (or hoped?) thousands of workers from the Middle West will return home.

Work at other Portland yards includes six 100-foot tugs on the ways at Commercial Iron Works while at the plant of Gunderson Bros. six 100-foot harbor tugs are under construction, a sixth being outfitted. Albina Engine & Machine Works has a backlog that will keep it busy for six to nine months, the work including four lumber carriers, for the coastwise routes and 20 smaller island vessels for the Netherlands East Indies government. Some of the smaller Portland yards are equipped for repair contracts which they will seek but the larger construction plants are expected to close completely where ship contracts are ended.

Boeing Aircraft Co. has laid the groundwork of a postwar program which it hopes will permit operation in the future on a larger scale and with a larger payroll than before the war. It is announced that no drastic immediate cutback in employment is anticipated. Normal terminations will in time reduce the payroll considerably. The company has postwar orders for continued work on advanced B-29 Superfortresses. At the proposed reduced monthly production it will be possible to spread reductions over the next two months.

Boeing has service test contracts for a limited number of C-92 transports for the Army Air Forces and other work of an experimental nature. In the commercial field much interest is indicated in the Boeing Stratocruiser, the commercial version of the C-97. No contracts for this type have been closed. Preliminary work is under way on two smaller air line transport types.

San Francisco Transition Picture Seen Favorable

SAN FRANCISCO

Reconversion in the San Francisco area presents a mixed picture, but

Discharged war workers at Douglas Aircraft Co. plant, Long Beach, Calif., head for the street and unemployment. From this plant alone 11,900 employees were cut adrift in one day. NEA photo

on the whole a favorable one. The overall transition period may be shorter than had been expected previously.

For a majority of manufacturing enterprises in this region, reconversion will be relatively simple. For most companies it will mean switching customers rather than products. The things that many companies made here for war purposes are the same as or closely similar to those which they made for civilian uses before the war and which they will make again for postwar civilian consumption.

Probably the biggest stumbling block will be material supplies. The time required to acquire adequate stockpiles of raw materials probably will measure for many the time needed to get into full postwar production. Labor supply will increase steadily.

Materials also will be a delaying factor in getting started on the large amount of pentup industrial expansion and public and semipublic work projects. For the San Francisco area this backlog has reached a total of $300 million.

The long range prospect for San Francisco—and in fact the entire West Coast—is bright from an industrial standpoint, although not as glowing as some reports would have it. Manufacturing activity is not going to be as great as in wartime, but measured against prewar the comparison will be favorable.

Local and state governmental agencies are getting prepared to tackle the many problems which will come with transition from war to peace. The California legislature is likely to be called into special session within the next month to study and act on a postwar unemployment program.

Production Pattern Will Change Rapidly in Los Angeles District

Accurate evaluation of impact of war's sudden end on southern California industry is difficult. Workers being released by thousands from war plants but civilian industries expected to take up much of slack

LOS ANGELES

ACCURATE evaluation of the impact of the war's sudden end upon southern California industrial plants was hard to arrive at, in the state of general turmoil which followed Japan's surrender and subsequent military contract terminations.

Facets of the overall picture included the laying off of thousands of workers in aircraft and ship plants as well as other major industries and at the same time a scramble for needed labor on the part of smaller factories and organizations suffering from chronic labor shortages throughout the months of hostilities.

Reports from individual plane plants and from major shipyards—two of the Los Angeles area's lustiest industries—indicated that by last midweek about 40,000 war workers had been discharged.

The largest reported cut in manpower in a Los Angeles area aircraft plant was at Douglas Aircraft's Long Beach plant where 11,900 workers received final paychecks last Friday.

The majority of the plane factories plan to return to the 40-hour-week forthwith.

Meanwhile, Raymond Krah, WMC director for southern California, declared that an increasing demand for workers from smaller plants is making itself felt at United States Employment Service offices throughout the region.

With the end of manpower controls, Mr. Krah said, many employers are staffing plants with help for immediate reconversion programs already under way. One such example, he pointed out, is a large oil company which late last week placed orders with the USES for approximately 300 pipefitters and helpers to relieve a long unfulfilled need in the industry.

Due to rapidly changing labor market conditions, Mr. Krah pointed out, the WMC or the USES cannot pretend to list daily requirements in any industry. The trend, he declared, is nevertheless plainly indicated. Numerous occupations such as railway and other transportation mediums, service trades, prewar makers of civilian items who will now return to former production, and other fields all offer openings in a multitude of trades to workers who have recently confined their efforts only to wartime industries.

GM May Buy Assembly Plant Site Near Los Angeles

Negotiations are under way by General Motors Corp. for the purchase of 125 acres in the San Fernando valley a few miles northwest of Los Angeles, as a site for an assembly plant to supplement the corporation's present plant at South Gate, south of the city, it was announced recently. The plant will employ approximately 5000 workers, according to information supplied by the realty concern handling the transaction.

Kaiser Gets Reconversion Loan for Fontana Steel Plant in New Financing Arrangement

LOAN of an additional $11,500,000 to Kaiser Co. Inc., for improvements to and conversion of its steel plant at Fontana, Calif., was announced last week by the Reconstruction Finance Corp. As a result of the loan the total indebtedness of the company to RFC will be revamped. The original loan was for $111,805,000 for construction of the plant, at the request of WPB, and to provide operating capital.

Under the new terms RFC will take a 15-year 4 per cent first mortgage of $69,500,000 which represents $58,000,000 sound value of the present fixed assets plus the new improvements and plant additions. It also will take a 25-year second mortgage for $34,510,380 without interest representing the balance of the original loan invested in fixed assets. Also it will take a $10,318,000 note secured by 103,180 shares of 4 per cent first preferred stock of Kaiser Co. Inc., having par value of $100. Interest on the first mortgage loan and dividends on the preferred stock are payable during the first two years only to the extent earned.

Net profits received by the Kaiser Co. from ship construction will continue as security for the revamped loans, it is understood.

Steel Industry Ranks Fifth in Safety in 1944

High place attained despite highest output and employment in history of the industry, institute points out

THE STEEL industry ranked in fifth place in freedom from accidents in 1944, the American Iron & Steel Institute, New York, reported last week.

This ranking was attained despite the fact that production and employment were the highest in the industry's history. Only a decade ago, the industry was in twelfth place among major industries in freedom from accidents.

During 1944, the rate of frequency of steel plant accidents was 8.1 per million man-hours worked, almost 45 per cent better than the average frequency rate of 14.5 recorded for 39 major industries.

Despite the drive last year for maximum steel production, which resulted in a new record of more than 89,550,000 tons of steel output, the steel plant safety record was 25 per cent better than in 1934 when production of the industry at 29,200,000 tons was only one-third as great.

The 1944 safety record, however, was slightly below the 1943 rate of 7.4. The decline largely reflects the fact that during last year approximately 200,000 new employees, most of them inexperienced, were added to the payrolls of the industry to replace more experienced employees going into the armed forces or leaving for other causes.

AWARDS . . .

The Army-Navy "E" Award for excellence in manufacture of war materials has been given the following:

Appliance Mfg. & Supply Co. Inc., Brooklyn, N. Y.
Bodine Corp., Bridgeport, Conn.
Chas. D. Briddell Inc., Crisfield, Md.
Bulova Watch Co., Woodside plant, Woodside, N. Y.
Corbitt Co., Henderson, N. C.
Croessant Machine Works, Reading, Pa.
De Laval Steam Turbine Co., Trenton, N. J.
Dienelt & Eisenhart, Philadelphia.
General Motors Corp., Pontiac Motors Division, Plant 14, Pontiac, Mich.
Hamelco, Port Chester, N. Y.
Forrest A. Heath Co. Inc., Denver.
Holsclaw Bros. Inc., Evansville, Ind.
Master Mfg. Co., Hutchinson, Kans.
L. J. Mueller Furnace Co., Milwaukee.
Phoenix Mfg. Co., Forging Division, Catasauqua, Pa.
Reading Air Chutes Inc., West Reading, Pa.
Rowe Mfg. Co. Inc., Belleville plant, Belleville, N. J., and Clifton plant, Clifton, N. J.
Timpte Bros., Denver.
Wright File Co. & Wright Engineering Co., Lisbon, O.

ALUMINUM ROOF: This aluminum roof recently was installed over the cast house at Reynolds Metals Co. plant in Louisville, Ky. Tests have shown the 24S-T pure clad alloy 0.032-gage sheets will wear well and resist the corrosion by cast house fumes

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Tubular Service Corp., 32 Broadway, New York city, operating offices and warehouses in New York, Philadelphia, Boston, Pittsburgh, Cleveland, Cincinnati, St. Louis, Birmingham, Detroit and Buffalo, has announced the resignation of Herman L. Wanderman as president and director of the company and the sale of his entire stockholdings effective as of Aug. 31.

—o—

Standard Steel & Wire Corp., Chicago, has purchased premises on Southport and Cortland Streets formerly occupied by Chicago Nipple Mfg. Co.

—o—

The Consolidated Tube Sales Co. Inc., 32 Broadway, New York, announces its liquidation effective Aug. 20.

—o—

Grede Foundries Inc., Milwaukee, held a 25th anniversary dinner Aug. 13 at the Milwaukee Athletic Club, with William J. Grede, founder and president, guest of honor.

—o—

Asa S. Cook Co., New Haven, Conn., has moved its equipment to enlarged quarters, 1475 Elmwood Avenue, Providence 7, R. I.

—o—

Consolidated Tube Sales Co. (not inc.) with offices in the First National Bank Bldg., Mt. Vernon, N. Y., has been formed by Herman L. Wanderman who has resigned as president of the Tubular Service Corp. The new company will specialize in the wholesale handling of steel tubular products.

—o—

C. S. Johnson Co., Champaign, Ill., has developed a new-type portable twin-

silo cement batching plant, with capacity up to 1600 barrels. The plant is constructed of all-welded units and can be set up without a crane if so desired.

—o—

Monsanto Chemical Co., St. Louis, has announced that through its Seattle subsidiary, I. F. Laucks Inc., it will erect a plywood adhesive plant near Seattle.

—o—

Steel Conversion Corp., Las Vegas, Nev., is now in partial production, and has named Consolidated Distributors Corp., San Francisco, its distributor in northern California, Washington and Oregon.

—o—

Certified Alloy Valve Co., Hillside, N. J., has been formed as a new division of Cooper Alloy Foundry Co., of Hillside. The new division will specialize in manufacture of stainless steel valves.

—o—

Carnegie-Illinois Steel Corp., Pittsburgh, U. S. Steel subsidiary, has formed a new division of the General Sales Department, to be known as the Specialty Products Division.

—o—

Industry Inventions Inc., Akron, has been established to license the use of electronic vulcanization of rubber and plastic products.

—o—

Society of Industrial Engineers has been formed in the San Francisco Bay area by 60 engineers. Officers are Prof. E. P. DeGarmo, department of engineering, University of California, president; J. R. Frost, California & Hawaiian Sugar Co., vice president; J. G. Porteus, Simmons Co., secretary; and G. R. Considine, Kaiser Cargo, treasurer.

—o—

Republic Steel Corp.'s Youngstown plant has set a new world's record for safety, open-hearth employees having worked 1,156,713 man-hours since Aug. 7, 1944, without a single lost-time accident.

—o—

Dockson Corp., Detroit, has acquired the manufacturing rights of the Maluminum Co. Inc., Indianapolis, and facilities for manufacture and sale of iron, brass, bronze and aluminum flux have been completed at the Dockson plant in Detroit.

Only Officials of Welding Society To Meet This Fall

The annual meeting of the American Welding Society, usually held in October each year, will not be held this year because of poor travel and hotel housing conditions. The meeting is usually attended by several thousand welding engineers and designers.

A meeting of the national officers, the board of directors and committee chairmen will be held in New York at the Hotel Pennsylvania on Oct. 18 to deal with matters which require official action that cannot be delayed. They will also give the prizes and awards earned by members during this year. Papers prepared for presentation at the canceled meeting will be published.

Experimental Iron Plant To Be Built in Minnesota

Iron Range Resources & Rehabilitation Commission of Minnesota, has approved expenditure of $300,000 for construction of a powdered iron plant to be built on the iron range in northern Minnesota. The plant, to be built as soon as war-released material and manpower are available, will be an avenue for possible use of low grade iron ore deposits in that area. It will be used to test and develop manufacture of high-purity iron powder from carbonate iron slate of the Mesaba iron range.

Foundry Equipment Makers Association To Meet

Foundry Equipment Manufacturers Association will hold its 27th annual meeting at Hot Springs, Va., Oct. 19-20.

Particular attention will be given the problems now facing the foundry equipment industry in conversion to peacetime production. All producers of equipment used by foundries are eligible to participate in the meeting.

Plant Nears Full Speed on Civilian Work

Kinner Motors expects to be in capacity production by next month on $500,000 backlog of orders

KINNER Motors, Los Angeles, expects to be in full production by next month on a $500,000 backlog of orders for the company's new 5 hp industrial engine. John N. Gladden, president of the company, announced last week.

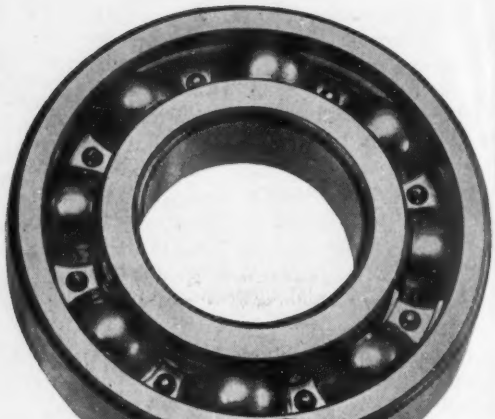
Most of the current orders are from domestic users, Mr. Gladden said, adding that many inquiries on the engine have been received from Canada, Australia, South Africa, and South American countries.

The company also is making hydraulic equipment on government order, it was disclosed, of a type that will probably remain unaffected by war-end terminations.

Kinner, it was reported, has taken over the government's supply of Kinner parts for resale as an agent of the Reconstruction Finance Corp. to owners of private planes powered with Kinner-made engines formerly manufactured on government contracts.

MANAGE BRITISH BRANCH: Brig. W. E. R. Blood, managing director-designate, and Maurice Foote, plant manager, confer on plans for a branch factory in England to be established by R. G. LeTourneau Inc., Peoria, Ill., to produce earth movers for the United Kingdom and Continental countries

Ball and



By
HUDSON T. MORTON
Chief Metallurgist
and
EARL E. WAGNER
Metallurgist
Hoover Ball & Bearing Co.
Ann Arbor, Mich.

FIRST ball bearings used in bicycles were made of any steel available. In 1880 this included soft machinable steels, cast steels and those which could be hardened. Early tests, particularly those conducted by Professor Stribeck[1] in 1900, indicated that the carrying capacity of balls and races was dependent on surface hardness as well as on the depth of penetration of the hardness, while wear resistance required the presence of hard carbide particles.

The requirements of good bearing materials were outlined by Henry Hess[2] in 1907 as follows:

"Any material may be used that will not, under the working load, be stressed sufficiently beyond the proportional limit to bring about its destruction before the lapse of a desired working life."

In operation, the load on the balls and races varies from zero to a maximum when one ball carries approximately one-half of the total bearing load during a small turning angle. This maximum load approaches the proportional limit of the steel and causes deflections of the surfaces of the ball and races. Tests indicated that case-hardened materials flexed so far that early fatigue failures occurred, because the core did little to support the load. This was true of both carburized steels and plain high carbon steels. Immediately, steels of deep penetration of hardness were used. Chromium appeared to be the alloying element which could impart this penetration of hardness to the steel. Chromium steels seemed to have both the wear and fatigue resistance necessary in a bearing capable of long life and high load capacity.

At the time Henry Hess[2] wrote on ball bearings, the use of chromium alloy steel for quality bearings already was well established. Since that time, many manufacturers have standardized their steel specifications with various percentages of chromium as the chief alloying element.

Steels containing about 1 per cent carbon and up to 1.6 per cent chromium have become the industry standard. They can be heat treated to a surface hardness of rockwell C 63 and C 65, and in most parts the hardness is fairly uniform throughout the cross-section. Extensive tests and service operations have shown these alloys to have exceptional resistance to wear and fatigue failures.

The ball bearing industry has felt that the penetration of hardness should be nearly uniform from surface to center of balls and races, but no more chromium should be used for a given section than necessary. Each bearing company ran independent tests to determine the proper chromium content for each ball and race size. As a result of these tests, specifications were written stating the analysis of the steel and limiting the surface defects, inclusions and other material defects in the steel. Definite requirements for steel quality were set forth in various company metallurgical specifications.

When alloys seemed critical in 1941, the Antifriction Bearing Manufacturers' Association called a meeting of their metallurgists and engineers to discuss alloy substitutions. As a result of meetings of the Annular Bearing Engineers' Committee and the Roller Bearing Engineers' Committee, a research program was adopted, material was purchased, and fatigue tests on bearings were started. After completion of the tests in 1943, no substitutions were made in the ball bearing steel alloys because chromium became less critical than the substitute materials. The nickel content of roller bearing steel was reduced as mentioned later.

Just before the start of World War II, there were about 27 different analyses of chromium alloy steel used in the bearing industry and the steel mills were required to keep on hand various amounts of each kind. With the advent of the war, the WPB suggested the number be reduced and accordingly appointed a committee composed of metallurgists representing the bearing manufacturers and the steel producers, known as the Bearing Steel Section of The Technical Advisory Committee on Carbon and Alloy

Roller Bearing Steels

Over the years, many different steels have been tried for ball and roller bearings, but carbon-chromium and nickel-chromium-molybdenum grades remain standbys. NE 52100 given preference for certain applications

Steel Bars, which was further subdivided into the Ball Bearing group and the Roller Bearing group.

The first action was the approval of three analyses of NE 52100 steel instead of the 27 formerly used. This did not mean change of analysis, but merely a regrouping of ball and race sizes to eliminate those chromium contents between the new standards. This regrouping was planned in such manner that it would not affect the penetration of hardness. It was understood that the smaller balls and races would be made from the lower chromium steels.

The next action taken was to standardize the methods of testing. Inasmuch as each manufacturer was producing al-

TABLE I

Typical Heat Treating Operations

	NE 52100 A	NE 52100 B	NE 52100 C
Forge	1800°-2050° F	1750°-2000° F	1700°-2000° F
Normalize	1550°-1700° F	1550°-1700° F	1525°-1675° F
Spheroidize anneal	soak 7-35 hours at 1250°-1400° F and slow cool	soak 7-35 hours at 1250°-1400° F and slow cool	soak 7-35 hours at 1250°-1400° F and slow cool
Annealed hardness			
Brinell	207 max.	207 max.	.....
Rockwell	.....	.....	B92 max.
Machining	85SFM	85SFM	85SFM
Hardness as quenched	Rc 65-67	Rc 65-67	Rc 65-67
Quench in oil from	1500°-1600° F	1480°-1580° F	1460°-1560° F
Quench in water from	1460°-1520° F	1460°-1520° F	1440°-1510° F
Draw	250°-450° F	250°-450° F	250°-450° F

SPECIFICATION NO. 2

Chrome-Carbon Steel Wire—Cold Drawn.

ANNULMENTS:

1. This specification supercedes all previous specifications or letters of instruction covering this material.

MANUFACTURE:

2. The material must be made by the Electric or Crucible process.

QUALITY:

3. The material must be of highest quality in every respect, of uniform composition, and free from slag or other segregation.
The wire must be free from imperfections, such as pipes, seams, rolling laps, checks or laminations, either on the surface or in the section of the wire.

WORKMANSHIP AND FINISH:

4. The wire must be of good workmanship, must have a good surface finish, and must be true to diameter ordered within the limits of plus .002 in. and minus .002 in.
If the wire is out-of round, the mean of the largest and smallest measured diameters must be equal to the size ordered, but in no case can they exceed the limits of plus .002 in. and minus .002 in.

COMPOSITION:

5. Upon the receipt of material at destination, drillings may be taken from the several coils, selected at random for analysis, and must show the composition of the material to be uniform and within the following requirements.

Carbon	.95% to 1.05%
Chromium	.75% to 1.05%
Manganese	.30% to .45%
Silicon	.20% to .35%
Phosphorus under	.025%
Sulphur under	.025%

CONDITIONS:

6. The material must be thoroughly and uniformly annealed and the fracture must be close grained.
The Brinnell hardness (5 m/m Ball under 1000 Kg. pressure) must not exceed 170 at any point in the length or any point in the cross section of the wire, so that when blanks made therefrom are cold upset into the form of a Ball, no defects will open up in the outside surface of the Ball.
The wire must be free from any decarbonized surface and after hardening must show a close grained velvety fracture.

COIL SIZE, WEIGHT AND CONDITION:

7. Coils must be reeled uniformly and the layers must be bound together securely with separate tie wires to keep them in good shape during transportation so that they can be unwound properly without tangling. If the ends of the coil are tapered down or imperfect in any way they must be "cropped" off.
Coils may be covered with a coating of oil or grease to protect them from rusting during transportation, but the coils must be free from any hard or gritty foreign matter that would interfere with their proper operation in the heading machine.
The coils must not be less than 18 in. inside diameter or greater than 34 in. outside diameter. Wire of heavy cross section should be wound in as large a coil as possible, but within the outside diameter limit given above.
The coils should weigh not less than 90 pounds or more than 110 pounds for wire above .235 in. diameter. Coils of wire below .235 in. diameter may weigh as low as 70 pounds.

REMARKS:

8. Material which fails to meet the above requirements will be rejected and returned. The manufacturers must pay all transportation charges on rejected material.
Ann Arbor, Mich., June 1st, 1919.

SPECIFICATION NO. 6

Chrome-Carbon Steel Bars—Hot Rolled.

ANNULMENTS:

1. This specification supercedes all previous specifications or letters of instruction covering this material.

MANUFACTURE:

2. The material must be made by the Electric or Crucible process.

QUALITY:

3. The material must be of highest quality in every respect, of uniform composition, and free from slag or other segregation.
The bars must be free from imperfections, such as pipes, seams, rolling laps, checks or laminations, either on the surface or in the section of the bar.

WORKMANSHIP AND FINISH:

4. The bars must have as good a surface finish as is consistent with good hot rolling practice. They must be free from excessive scale, and must be true to diameter ordered within the following limits:

Bars up to and including ⅝in. diameter	Minus 0 and Plus .010 in.
Bars over ⅝ in. to 1¼ in. diameter	Minus 0 and plus .012 in.
Bars over 1¼ in. to 2 in. diameter	Minus 0 and plus .015 in.
Bars over 2 in. to 3 in. diameter	Minus 0 and Plus .020 in.

If the bar is slightly out-of-round, the mean of the largest and smallest measured diameters must be within the minus and plus limits given above.
Appended to this specification is a table giving the prevailing sizes (diameter) of stock which we use, and the corresponding decimal sizes. We reserve the right to change this list from time to time when necessary but the order or contract calling for the material will specify the size wanted.

COMPOSITION;

5. Upon the receipt of material at destination, drillings may be taken from the several bars, selected at random for analysis, and must show the composition of the material to be uniform and within the following requirements.

Bars ½ in. to ⅞ in. diameter inclusive:—

Carbon	.95% to 1.05%
Chromium	1.05% to 1.35%
Manganese	.30% to .45%
Silicon	.20% to .35%
Phosphorus under	.025%
Sulphur under	.025%

Bars over ⅞ in. diameter:—

Carbon	.95% to 1.05%
Chromium	1.35% to 1.65%
Manganese	.30% to .45%
Silicon	.20% to .35%
Phosphorus under	.025%
Sulphur under	.025%

CONDITIONS:

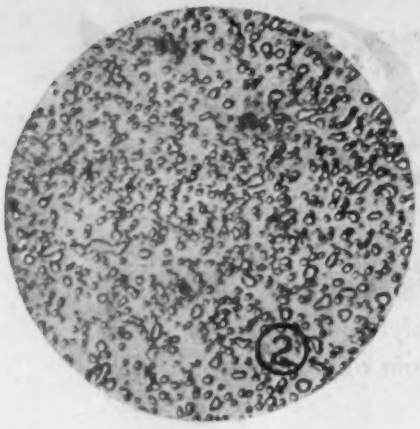
6. The material must be thoroughly hot worked to produce a fine grain and must not, subsequent to this hot working, be subjected to a high temperature such as would produce a coarse grain.
The surface of the bars must be free from decarbonization to the extent that upon removing .005 in. from the diameter of the bar, the remaining section will retain its full quota of carbon as called for under composition.
The bars must be cut to uniform multiple lengths as ordered. A preferred length will be specified on the order, also a minimum length and a maximum length, but in no case may intermediate lengths be supplied.

SHIPPING:

7. When two or more different sizes are shipped together in the same car, they must be so arranged and located in the car that they will not become mixed during transportation.

REMARKS:

8. Material which fails to meet the above requirements will be rejected and returned. The manufacturers must pay all transportation charges on rejected material.
Ann Arbor, Mich., June 1st 1919.



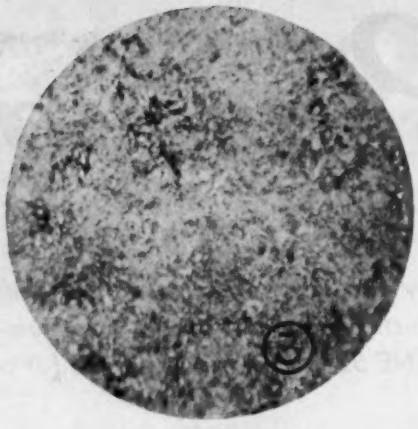


TABLE II
Roller Bearing Steels

Number Use	RBEC 4720 Small Races Per Cent	SAE 4615 Rolls and Med. Per Cent	SAE 4820 Large Rolls and Races Per Cent	SAE 4320 Large Rolls and Races Per Cent
Carbon	0.17-0.22	0.13-0.18	0.18-0.23	0.17-0.22
Manganese	0.45-0.75	0.45-0.65	0.50-0.70	0.45-0.65
Phosphorus	0.040 max.	0.040 max.	0.040 max.	0.040 max.
Sulphur	0.040 max.	0.040 max.	0.040 max.	0.040 max.
Silicon	0.20-0.35	0.20-0.35	0.20-0.35	0.20-0.35
Nickel	1.35-1.65	1.65-2.00	3.25-3.75	1.65-2.00
Chromium	0.35-0.65	.....	.....	0.40-0.60
Molybdenum	0.15-0.25	0.20-0.30	0.20-0.30	0.20-0.30

SPECIFICATION NO. 3

Chrome-Carbon Steel, Ball Wire,—Cold Drawn

Annulments:

1 This specification supersedes all previous specifications or letters of instruction covering this material.

Manufacture:

2 The material must be made by the Electric or Crucible process.

Quality:

3 The material must be of the highest quality in every respect, of uniform structure and free from segregation.

4 The wire must be free from rolling laps, seams, checks, pits, pipes, slag, or any other defects which might appear either on the surface or in the section of the stock.

5 The material must be free from any decarbonization and must harden in oil or water according to its size, without the removal of surface metal. The hardened samples must be file hard and must have a uniformly fine grained fracture of good quality.

6 Sizes below .100 inch diameter are water quenched; from .100 inch diameter up to and including .235 inch diameter are quenched in oil; and sizes above this are water quenched.

Conditions and Size:

7 The surface of the wire must possess a good surface finish and be free from any foreign matter which is hard or gritty, or which will be detrimental to its shearing or cold heading quality.

8 The Brinell hardness of the stock as received (5 mm. ball under 1000 Kg. pressure) must not be below 170 or above 200 at any point in the length or any point in the cross section.

9 The material must be thoroughly and uniformly annealed so as to meet the Brinell requirements given above, while the carbides must have a finely divided globular structure, uniformly distributed. The fracture in the annealed state must be uniformly fine grained and of good quality.

10 The wire must be true to the diameter ordered within the limits of plus .002 inch and minus .002 inch.

11 If the wire is out-of-round, the mean of the largest and smallest measured diameters must be equal to the size ordered within the limits given, but in no case can the measured diameters exceed the limits of plus .002 inch or minus .002 inch.

Composition:

12 Upon receipt of material, samples may be taken from coils selected at random for analysis, and must show the composition to be uniform and within the following requirements,—

Carbon		.95% to 1.05%
Chromium		.45% to .65%
Manganese		.30% to .45%
Silicon		.20% to .35%
Phosphorus	under	.025%
Sulphur	under	.025%

Coil Size, Weight and Condition:

13 A coil is considered as consisting of one unbroken length of wire.

14 Coils must be reeled uniformly and must not be in a distorted condition when received, and the layers must be bound together securely with separate tie wires to keep them in good shape during transportation so that they can be unwound properly without tangling.

15 If the ends of the coils are tapered down or are imperfect in any way they must be "cropped off."

16 Coils may be covered with oil or grease to protect them from rust, from which they must be free upon arrival at our plant.

17 The coils must not be less than 18 inches inside diameter or greater than 34 inches outside diameter. Wire of heavy cross section should be wound in as large coils as possible, but within the limits given.

18 The coils should weigh not less than 90 pounds or more than 110 pounds for wire above .235 inch diameter. Coils of wire below .235 inch diameter may weigh as low as 70 pounds.

Remarks:

19 Material which fails to meet the above requirements will be rejected and returned.

20 The manufacturer must pay all transportation charges on rejected material.

Ann Arbor, Michigan.
June 1st, 1923.

most identical bearings and balls, the steel mills felt that one uniform set of tolerances and limits for defects should suffice for the industry. With this thought in mind, each type of test given in an individual specification was discussed in detail by the entire committee. Some compromises were required in order to establish defect limits acceptable to the majority present. These individual tests and limits then were incorporated in a broad specification covering analysis, methods of testing, etc., so that this specification could be used by all bearing companies and their steel suppliers.

In order that the decisions of these meetings might be properly publicized, the results were given to SAE and the ASTM. The analyses were incorporated in the list of NE steels. The ASTM felt that the whole program would be published complete and, therefore, compiled the emergency specification ES-5a3 to include the decisions of the meetings.

In order to properly machine and cold work NE 52100 steels, it is necessary to spheroidize anneal it. Typical heat treating operations are outlined in Table I.

A satisfactory structure of annealed steel is shown in Fig. 2 where the spheroids are neither too large nor too small. When this steel is heated, some carbides go into solution. The quantity in solution increases with soaking time. The excess will remain as spheroids as shown in Fig. 3.

Research during the last 10 years had indicated that alloys other than NE 52100 might be used. Several promising combinations have been devised, but due to the years of experience in the fabrication and service results obtained with NE 52100 steel, it did not appear to be advisable to make any changes. Special applications of balls and bearings, such as used at an elevated temperature, or in corrosive media, have required slight changes in analysis to secure specific results.

Mention should be made of the increased use of the various types of stainless steels in bearing manufacture. While the load capacity of a hardened stainless ball bearing is approximately half that of chromium steel, only a few types can be hardened sufficiently that they have any appreciable resistance to deformation. Stainless bearings are usually recommended only for slow speeds and very light loads when used under corrosive conditions. While the 18-8 type is regarded the best from a corrosion resistance standpoint, it cannot be hardened. The 1 per cent carbon and 17 per cent chromium steel seems to possess the best combination of hardness and corrosive resistance. The hardness of rockwell C 56 minimum appears to be the best obtainable to date. Bearings made of "K" Monel metal have also been used under exceptional conditions. This metal being comparatively soft, has very little load carrying capacity, and is, therefore, capable of only slow speeds.

Roller Bearing Steels: The steel sit-

(*Please turn to Page* 144)

One-Station Variable Speed Control Adds Flexibility to

Automatic Welding

IN CASES where automatic welding is indicated, there are two elements which control the speed of production: Welding time and handling time. In the past, it has been welding time rather than handling time which presented the problem.

With speeds of 40 ipm now being attained and speeds of 70 to 100 ipm within reach, this problem has been largely solved, the situation has been reversed, and handling time rather than welding time has become the principal factor for consideration.

Several factors make up handling time, an important element being the operation of the work positioner. As originally designed, the function of a positioner was merely to hold the work for down-welding in hand work. Little else was expected of it. Operated in the simplest possible way, either by hand, or jogged with ac motors, low cost was of first importance. With the change to automatic welding, the positioner has become a continuous operating production tool, making possible simpler and more accurate control of work.

Welding Head Purchased

When Reliance Electric & Engineering Co., Cleveland, first faced the problem of producing large numbers of welded parts for the Navy, a continuous welding head was purchased, and a welding positioner rebuilt. Control for automatic welding was supplied by the builder of the head, but was not synchronized with the table. Operation soon proved that for good results, table and arc should start simultaneously, and such an arrangement was made.

In designing controls for production tool, simplicity and ease of operation are the first requirements, because personnel vary in experience and skill. To achieve this, Reliance engineers centered all control functions in a single portable station, as shown in Fig. 2.

An infinite number of speeds, predetermined for each job, were made available by applying one of company's own products, its adjustable speed V-S drive. With this unit any speed can be set by the operator by manipulating a simple

(*Please turn to Page* 148)

Fig. 1 (*above*)—*Motor connected to table provides starting, stopping, reversing, etc.*

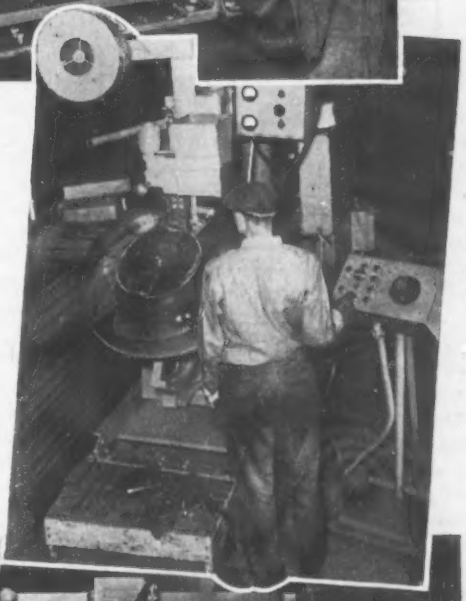
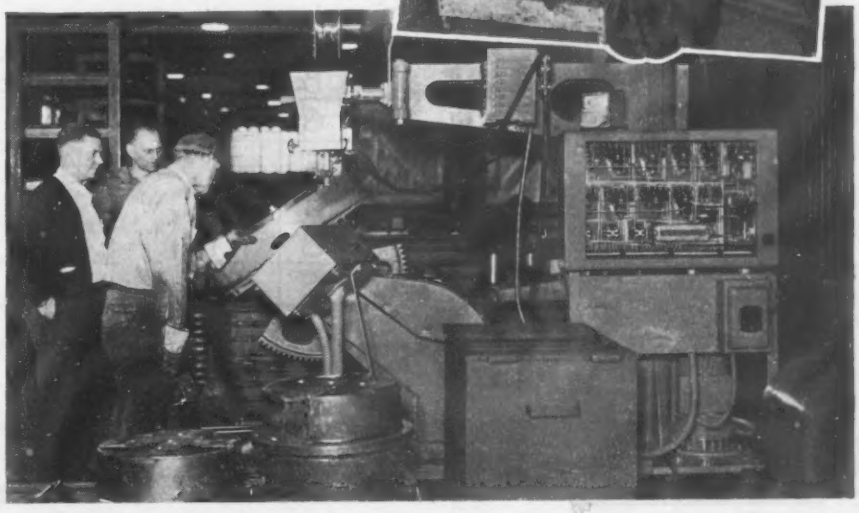


Fig. 2 (*right*)—*Control functions are centered in portable station. Manipulation of rheostat varies table speed*

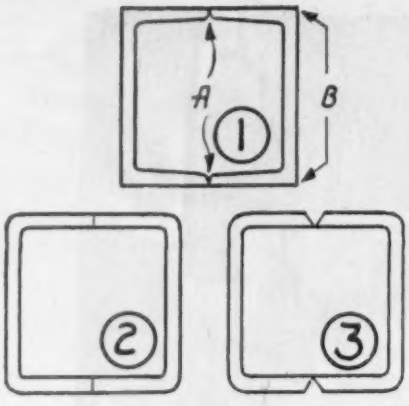
Fig. 3 (*below*)—*In addition to starting V-S control unit and M-G set, panel* (*at right*) *also contains reversing contactors for motors, table dynamic braking and rapid traverse relay*

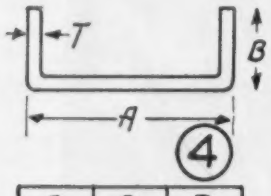


A Symposium on SPECIAL SHAPES for WELDING

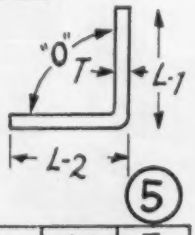
Steel fabricators describe types of sections which would facilitate production of finished products. Half of over 1900 plants want more special shapes

Conducted by
D. B. WILKIN
Associate Editor, STEEL



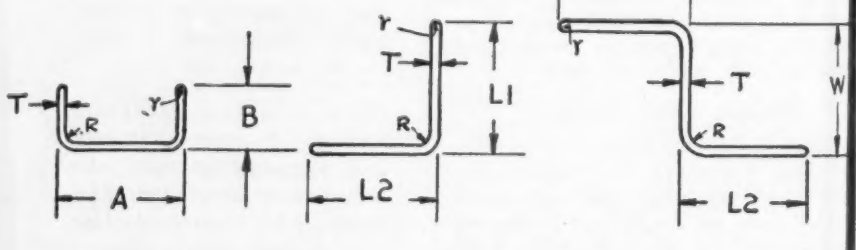


A	B	T
INCHES		
14	6½	½
10	5	½
9½	4	½
8	3½	7/16
10	3½	⅜
8	3	5/16
6	2	¼



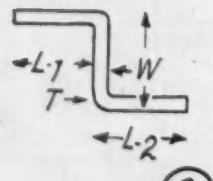
L-1	L-2	T
INCHES		
5	4	½
5	3½	½
4½	2½	⅜
15	3	3/16
8½	5	3/16

Angle O may be made greater than 90°



A	B	T
12	6	½
10	6	½
8	4	⅜
6	3	⅜
6	2	5/16
6	2	¼
4	2	¼
4	2	3/16

L1	L2	T
5	5	½
4	4	⅜
4	3	5/16
4	2	¼
3	3	3/16



L-1	L-2	W	T
INCHES			
6	6	4	½
5	5	4	⅜
6	4	3	¼

L1	L2	W	T
6	6	4	½
5	5	4	⅜
6	4	3	¼
4	4	2	¼

IN EACH CASE R SHOULD EQUAL T
IN EACH CASE Y SHOULD EQUAL ½ T

7

WELDING long has held place in the front rank of major fabricating tools. Great progress has been made in development of welding electrodes and machines, in perfecting automatic controls, in training welding operators and engineers, in knowledge of costs and adoption of standardized production practices.

As new materials were introduced, welding engineers and metallurgists surmounted difficulties which cropped up as a result of attempting to join materials of dissimilar composition. They have blazed a well-marked trail for those who would follow in joining shapes of irregular contour and dimension to the standard sections. Considerable ingenuity has been displayed in bending, forming and shaping sheet, plates, bars, etc., with the object of eliminating unnecessary beads and fillets.

Standard shapes have been converted by machine tool builders and machinery manufacturers to special uses in bases, diesel engine crankcases, and machine frames. Shipbuilders have turned their backs on traditional methods and upset one delivery record after another through universal adoption of mass production techniques predicated upon prefabrication of sections made up of many special shapes. In new designs for streamlined bridges, high-speed light-weight trains, agricultural and materials handling equipment, electrical switch cases and panels, jigs and fixtures, etc., there may be seen the trend toward special shapes—some built-up, some rolled.

From a survey conducted last year by STEEL among major industries using welding to fabricate a wide variety of products, it was learned that of the 1922 plants contacted nearly half, or 49.9 per cent, wanted more special shapes and 62.8 per cent of the ship, car, and locomotive builders favored an increase in such shapes. Need for further diversification of shapes was reported by the following: Agricultural equipment makers, 70.8 per cent; contractors' equipment, 72.7 per cent. Even office machinery manufacturers, restyling for greater efficiency, compactness and eye appeal, hope to find a more generous selection of special shapes after the war. A majority of 66.7 per cent is indicated.

According to W. J. Conley, consulting engineer, Lincoln Electric Co., Cleveland, (See STEEL, July 10, 1944, p. 88), advancement of arc welding has been retarded by failure to recognize that most present steel shapes were designed for other methods of construction, despite the greatly expanded use of arc welding. They do not permit utilization of the most simplified methods of fabrication with proper distribution of steel for the resistance of stresses. Summarized, Mr. Conley's argument is as follows:

1. When designing for welding, standard materials readily available should be specified whenever practical to obtain maximum economy and efficiency, despite the fact use of such materials—sheet and plate stock, bars, structural shapes, piping and tubing—presents handicaps. Structural shapes and piping were not produced with welding applications in mind.
2. By cold forming steel plate, modified corners which are desirable can be obtained, but for relatively short radii of curvature, cracks may form in heavy plate at the outside of the bend. These then become stress raisers, limiting full efficiency under loadings which produce rapidly repeated or shock stresses. Hot-rolled sections from the mill, possessing desired contour and at the same time being free of excess material, will remedy this defect.
3. Improved performance of a part made up of sections with rolled edges, rounded corners, and other ready-to-weld characteristics (viz., box sections made up of channels with as-rolled beveled edges presenting a V-opening to the outside), will allow a further reduction in weight of structures due to better stress distribution, thus making it possible to stress efficiently a maximum of a given cross section.
4. Shapes having square edges and rolled to form a natural bevel, when fitted together, will eliminate the cost of edge preparation and allow lower costs by facilitating welding. Designers easily could be educated to use a series of stock sizes of such shapes.
5. Piping lends itself to welding design, but the walls are relatively heavy in order to leave sufficient material after threading.

After noting the difficulties and disadvantages connected with forming standard available materials to desired shapes, Mr. Conley approves one class of material as being best adaptable to welded designs. This is the specialized tubing with wall thicknesses giving a good weight-strength ratio and distribution of metal. It can be purchased in the form of square or oval cross sections, gradually tapered, or with more specialized shapes for airplanes, etc. He points out its possibilities for use in bridges, buildings, and possibly, by modifying wall thickness somewhat, for use in machine bases.

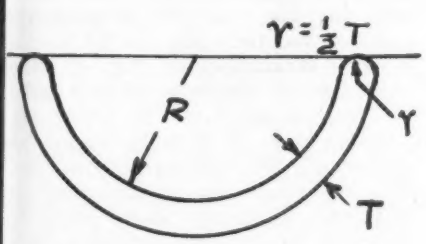
One box section of standard channels appears in Fig. 1 and five shapes recommended by Mr. Conley are shown in Figs. 2, 3, 4, 5, and 6.

Aware of the need for action and recognizing the movement as more than a groundswell caused by dissatisfaction of a few fabricators, Lincoln Electric Co. last fall wrote to a number of companies with which it was acquainted, asking for opinions and suggestions. Basis for the inquiry was the Conley article in STEEL. Replies indicate a lively interest in the subject.

T. D. Parsons, general foreman, United Shoe Machinery Co., Beverly, Mass., says there can be no question of the need for such shapes. "The demand undoubtedly will result in production of a moderate list of shapes and section weight which increasing use will amplify and modify," he states. Presented elsewhere in this article is a revised table of sizes for special rolled channels, angles, zees and radius sections, as proposed by Mr. Parsons. He notes their certain advantages for fabrication as follows:

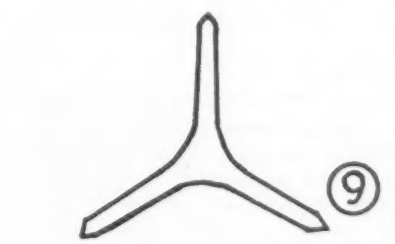
1. An extended number of lighter sections is desirable for greater flexibility of design.
2. Inside corner radii equal to the stock thickness are rolled easily.
3. Edges of approximately half-round design constitute fairly good bevel preparation as rolled, are of reasonably good apearance if exposed, and are readily subject to further preparation by beveling or grinding at minimum cost.

Another section which Mr. Parsons



R	T
3	3/8
2 1/2	3/8
2	5/16
1 1/2	5/16
1 1/4	1/4
1	1/4
3/4	3/16

⑧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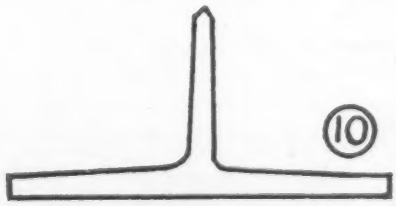

⑩

thinks would be very useful, but which is not now available, is the "half-pipe." He believes it has wide adaptability for large radius corners, for plate stiffeners, and for reinforcement strips in many locations. Sketches and size tables for these items are shown in Figs. 7 and 8.

H. C. Boardman, research engineer, Chicago Bridge & Iron Co., Chicago, reports that members of his organization have no doubt there will be developed many shapes designed specifically for welding. If they come into use, he says, shapes which were designed specifically for other types of construction probably will go out. He proposes shapes sketched in Figs. 9 and 10. Fig. 9 illustrates a shape suitable for pressure vessels in which three tension elements are joined. Fig. 10 illustrates curved flange with tongue suitable for welding to web. Apparently, this idea is based on the asssumption that if mills would roll and stock such a shape, there would be less need for splitting the webs of long I-beams or girders to allow spacing for more flexible and efficient distribution of the steel.

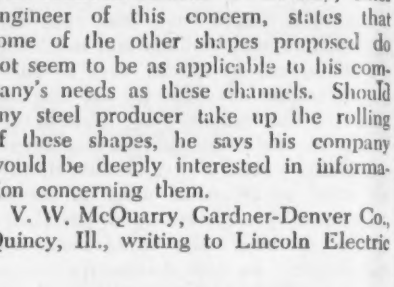
Figs. 11, 12, 13, 14 and 15 are shapes which Crown Iron Works Co., Minneapolis, Minn., finds more suitable to welded construction than existing sections. These ideas, advanced by K. A. Mousseau, welding engineer and supervisor for Crown, include a quarter-circle with radii from 1¼ to 8 in., with 60° outside bevel edges prepared for butt joints, and made from ¼ to ¾ in. thick material. The half-circle bears close resemblance to that suggested by United Shoe Machinery, except that Mr. Parsons' half-circle has round edges. Proposed round-cornered angle, Fig. 13, and channel section, Fig. 14, conform to the rather generally accepted ideas of many other individuals, in that corners are rounded and edges beveled in the right direction for butt welding. The T-chord member, Fig. 15, suggested appears to be a distinct departure from any available shape.

Sauerman Brothers Inc., Chicago, engineers and manufacturers of long-range materials handling machinery, through H. A. Roe, endorses with qualifications Mr. Conley's outline of prerequisites for special shapes to meet welding requirements. Their immediate interest is in channel and angle shapes of appropriate thicknesses, with rather long radius corners, and with edges beveled for welding to abutting plates. The modified angle suggested by both Crown and United Shoe Machinery also is proposed by Sauerman, only the latter specifies three variations—a 45°, a 90°, and a 135° angle.

H. C. Gill, superintendent, Missouri Boiler & Sheet Iron Works, St. Louis, feels that in addition to suggested shapes as presented in the Conley article, there should be added a modified I-beam or T-section, with a standard width flange on one side and a 1-in. maximum flange on the other side.

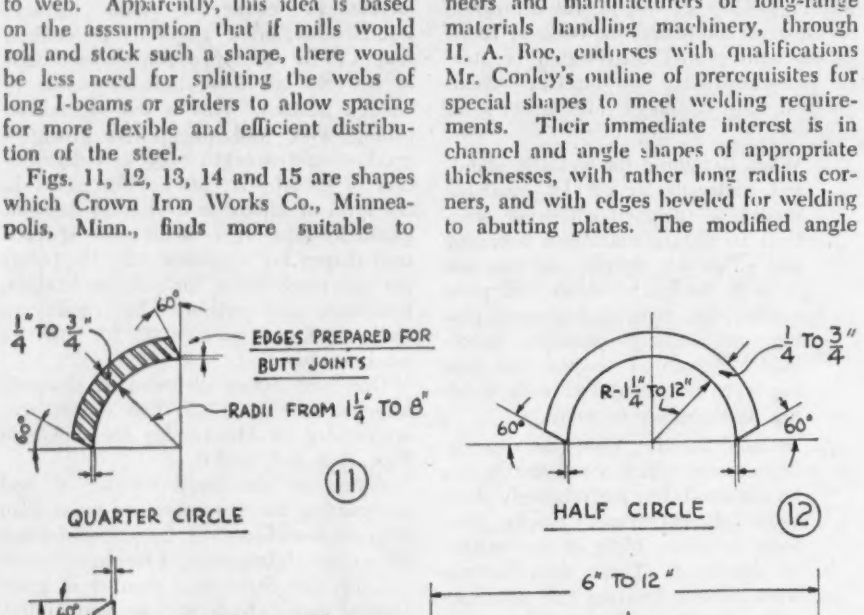
Insley Mfg. Corp., Indianapolis, Ind., manufacturers of power shovels and other construction machinery, would welcome an opportunity to purchase rolled shapes like those in Figs. 3 and 4. These Mr. Conley has shown as bevel edge and square-edge channels, respectively, both with rounded corners. F. B. Ray, chief engineer of this concern, states that some of the other shapes proposed do not seem to be as applicable to his company's needs as these channels. Should any steel producer take up the rolling of these shapes, he says his company would be deeply interested in information concerning them.

V. W. McQuarry, Gardner-Denver Co., Quincy, Ill., writing to Lincoln Electric



on this subject, expresses full agreement with the Conley ideas as to type and size, but he would like to see the proposed channel section (Fig. 4) rolled in base width sizes as small as 3 and 4 in. Mr. Conley, it will be noted, suggested a range of 6 to 14 in. for this dimension. Mr. McQuarry admits that this would have to be determined by experience after such shapes are introduced to the trade. He expresses some hope for what he describes as the "S" section (in realty, a modified zee), to the effect that other manufactureres would find use for it. This section is shown in Fig. 6. He says that, although Gardner-Denver at present does not have need for such a section, the company might adopt it if it someday became available. Stating that present day structural shapes do not always lend themselves to the best design in welded structures, Mr. McQuarry says that "from our standpoint, we would be glad to see some of the regular old sections ruled out as has been done recently in the simplification program of WPB, and some new sections, such as you suggest, introduced."

Like others who commented on the Conley ideas, A. W. Forbes, Forbes & Myers, electrical manufacturers, Worcester, Mass., shows considerable restraint



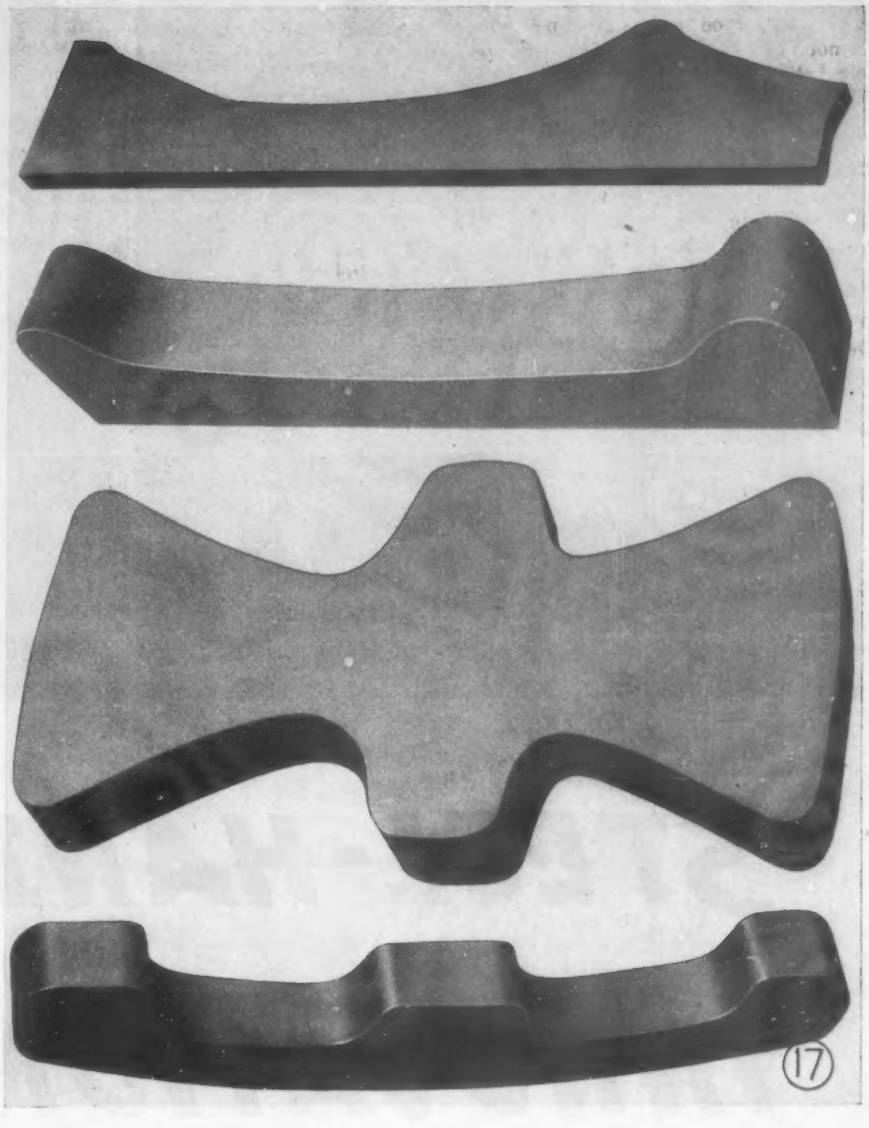
in the matter of recommendations. He states that, while they often have desired shapes differing from those of standard structural steel for use in welded structures, he finds these needs so varied as to make stating a claim for them impossible. "One of the things we would like is to see angles rolled to other angles than 90° (bearing out the Sauerman premise), but I do not know what angle to suggest, for each job seems to need a different angle," he confesses. Referring to Figs. 1, 2, and 3, Mr. Forbes believes that for jobs of this type, "I would use plates, for even if channels were rolled as suggested, they surely would be of the wrong dimensions. In most cases we do not want the sides parallel, making the use of plates essential."

Desired Shape Unavailable

J. E. Bushnell, research and development engineer, Ransome Machinery Co., Dunellen, N. J., builder of construction machinery, welding positioners, etc., writes that he recalls a number of cases in the past where a desired shape has not been available. One is a section which might be termed a TC section (channel section) or I section with the flange left off past the web on one flange only. "Angles often are used to make box sections similar to Figs. 1, 2 and 3 in the Conley article, and an angle section like Fig. 5 would be better than angle sections now rolled", he states. "Angles with equal legs give a square box section over a wide range of sizes and thicknesses. They are trimmed readily to produce square tapered sections, or, with unequal legs, rectangular tapered sections, thus providing more flexibility in box section design than channels. Offhand, a much wider range of sizes and thicknesses would seem advisable, though the sections shown (in Conley article) do not lend themselves to steel mill roll design for varying thicknesses as well as standard sections. That is one obstacle which must be hurdled."

Trend toward composite weldments, the parts of which are made up of castings, forgings, and rolled steel, or any combination of the three, is marked. Differences in section, in thickness and contour of abutting sections, has made this method of construction both practical and economical for many machines or machine frames. Consequently, forgers and foundrymen have an interest in the subject. L. C. Newton, general manager, Gilbert Mfg. Co. and Standard Salt & Cement Co., Stillwater, Minn., writes that it frequently has occurred to them as custom forgers that some preliminary forging of parts to go into welded assemblies would very appreciably increase welding production. For this reason, they are deeply interested in seeing such an investigation begun.

Mr. Newton's statement seems to suggest more a method of bridging the gap until such time as special rolled shapes become stock items, as an intermediate forging operation naturally would add to the cost of the piece and, ultimately, of the completed structure. Unless the special qualities imparted by forging were required for a given application, or, as is sometimes done where a complete forging is to be welded-in to a main structure incorporating some rolled steel, preliminary forging for the sole purpose of shaping the material might be regarded by certain advocates of the special shapes program as a needless expenditure of time and money.



Credit is due the press brake, forging hammer and hydraulic press for many made-up shapes, some of the higher carbon steels, and also to some high-strength, low-alloy sections which will take heavier stressing. However, the declared purpose of the fabricators, many of whom possess such forming tools, is to avoid the necessity of diverting them from their normal production functions by attracting to this project the interest of steel producers.

In justice to the steel industry, it probably is not, but should be conceded that the financial outlay connected with a program calling for extreme diversification hardly is warranted in view of the uncertain demand and multiplicity of shapes and sizes indicated. As is generally known, the very large cost of making special rolls, and all of the other expense incident to roll-changing and preparation for new production is authorized only in cases where there is sufficient demand for those special products. By studying the shape books of the companies producing structural and bar-mill shapes, one is impressed by the number and variety of special shapes —non-standard angles, channels, tees, vees, deformed bars and unusual sections—which have been made available to steel fabricators over the years. There is nothing new in the picture of a large consumer knocking at the steel company's door for special sections; railroad equipment and automotive industries have been doing it for decades. But it is significant that their requirements were standardized as to design and needed in volume. When below average in these respects, the customer absorbed the cost of his own rolls.

One effect of the war has been to add impetus for the creation of special shapes. In order to produce the special sections shown in Fig. 17, wanted for construction of a war item with high

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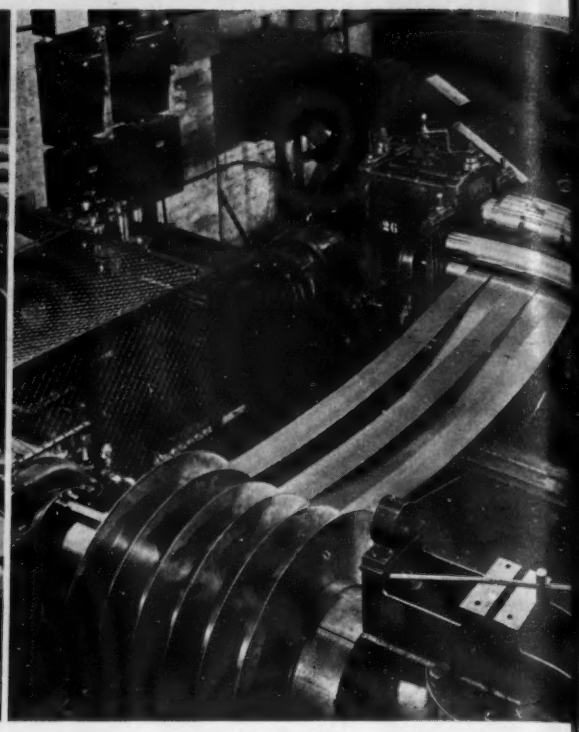


STEEL-HANDLING INNOVATIONS

. . . . greatly increase capacity of Chicago steel warehouse; provide ideas that can be utilized effectively to cut cost of steel storage, handling and processing in almost any plant

EXCEPTIONALLY efficient materials handling methods have drawn visitors from all over the country to see the facilities employed by General Steel Warehouse Co. Inc., Chicago. The cost of handling materials in an efficient manufacturing plant has been estimated at from 15 to 30 per cent of total production costs, rising to 50 per cent or more only in unusual instances. On the other hand, cost of moving material constitutes by far the greatest operating expense in a warehouse. It can easily swing the balance sheet from black to red if not carefully worked out.

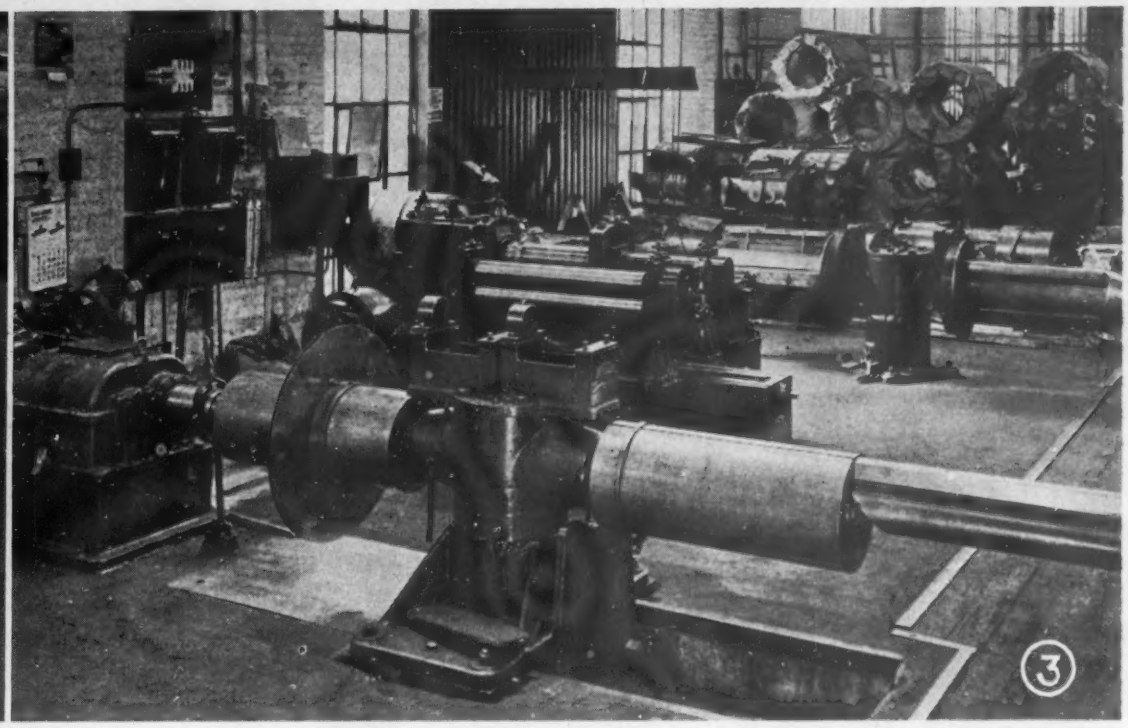
Because so many of the problems in handling steel encountered in a warehouse are also found in metalworking plants, the methods developed at General Steel are of interest in that they have contributed greatly to the efficiency of handling steel from mill shipment, through shearing, slitting, straightening, edging or other operations in preparation for shipment to the steel consumer of the exact form and quantities he wants.

Here in only 60,000 sq ft of floor space will be found an inventory of 15,000 to 20,000 tons of steel in addition to the processing equipment required to slit, level, edge roll and shear it as required. About 30 per cent of this tonnage is in the form of bar stock, the remainder in coils and flat stock and other steel products—no plates.

In this connection, Thomas P. Shelton, sales manager of General Steel, points out that before the war, there was hardly an item of ferrous or nonferrous metal that could not be obtained from the stock of some warehouse in Chicago. Not only was this true of Chicago but of many other large industrial cities throughout the United States. It was common to stock several hundred tons of a single size and grade in anticipation of the requirements of specific buyers.

"Instead of being simply a place to buy steel not readily obtainable from the mill, the steel warehouse is much more than this," explains Mr. Shelton. "Many manufacturers use only this source, a large percentage of finished steel being distributed through warehouses. Thousands of orders are handled daily through warehouses, orders which could not be filled by the mills." And he adds, "Size of orders is not the only reason for this."

"For example, just before the advent of priorities, an automobile production line was faced with closing in two weeks for lack of several carloads of a particular item of steel not readily available. It was 0.093-in. thick strip cut to an odd length. All producers had been contacted and best delivery offered was 6 weeks. A rolling mill and flying shear were practically necessary to fill the order. But it was not possible to get the order on an immediate mill schedule, nor could the material be obtained from a warehouse 'in the flat.'



By G. W. BIRDSALL
Associate Editor, STEEL

Fig. 1—Small slitter in Bay 1 with portion of coil stock in background

Fig. 2—Large slitter on elevated platform between Bay 1 and Bay 2

Fig. 3—Overall view of slitter in Fig. 2 with extra reels and handling facilities that permit five full-width coils to be in process simultaneously—one being run while another is being loaded and three that have been slit are being banded. See text for explanation

Fig. 4—Plan diagram showing layout of principal storage areas and processing equipment in Chicago plant of General Steel Warehouse Co. Inc. Notations: A—small slitters; B—large slitters; S—shears; R—recoilers; E—edge roller; SR—sheet roller

"While we had neither rolling mill nor flying shear in our warehouse, we were able to take coils from our stock and put them through four separate operations on four separate machines (slitter, roller leveler, edge roller, and shear). Although one machine had to be moved and rewired, the steel was put in the desired dimensions and delivered in 10 days.

"This is only one of numerous cases that illustrate the services steel warehouses can perform," points out Mr. Shelton. And to keep costs within bounds, all such operations must be done with mechanical handling aids and minimum re-handling of the material to speed up and facilitate the work.

Effective Floor Layout: Immediately apparent to the visitor at this plant is the study that has gone into arrangement of the stock and the various machines employed in changing it into the form desired by the customer. Not only that, but the arrangement of handling facilities to and away from these machines shows appreciation of the requirements of efficient materials handling.

Fig. 4 is a simplified floor plan, not to scale, showing roughly the layout of the plant and the location of the various pieces of equipment with the crane facilities available for serving them. Note that there are six bays, each about 40 ft wide and 180 ft long.

Incoming railroad shipments are received direct from cars on a siding that extends along the west side of the plant. See Fig. 4. In the first bay is a 15-ton cab-controlled crane which operates on

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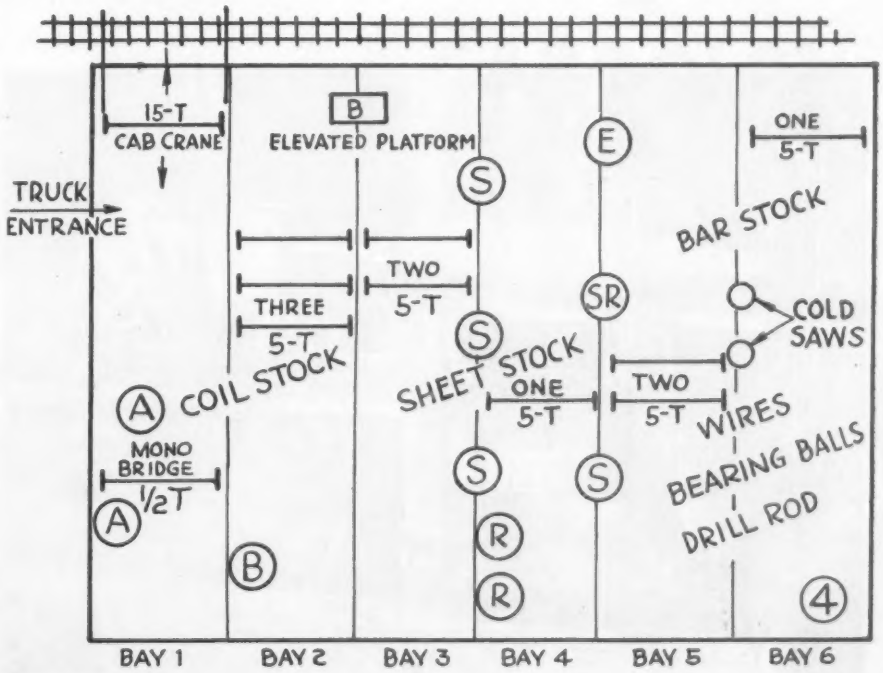
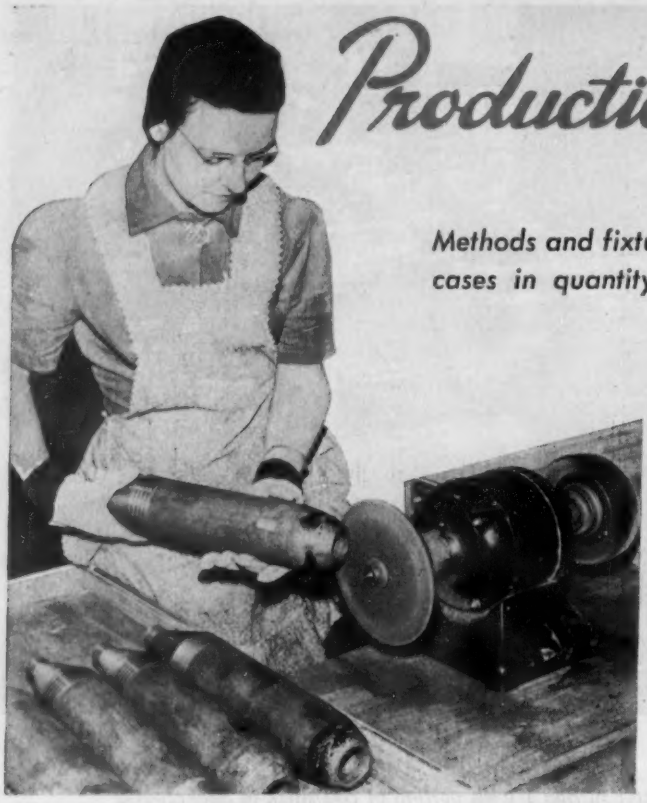


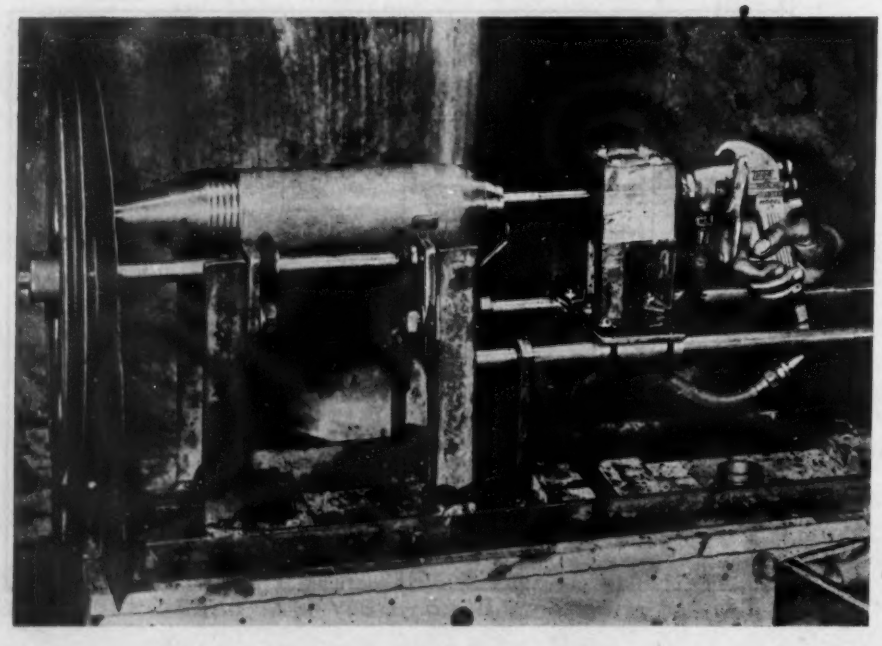
Production-Line Finishing

Methods and fixtures which were used for coating mortar shell cases in quantity suggest ready adaptation to other finishing problems



FIRST step in finishing 81 mm shell cases for the Army was cleaning of the cavities with a wire power brush. Ends then were buffed to a high gloss, as shown here, to provide a suitable surface for the exterior lacquer coat.

SECOND stop on the production line of Enamel Products Co., Cleveland, was the final inspection for rough or uneven spots on the interior of the case. Here an electric light was inserted by an Army Ordnance inspector in search of flaws.



THIRD operation in case-finishing was the coating of the interior of the case with an acid-proof black paint. The four wheels on which the case rested revolved by means of the mechanism at left, causing the shell to rotate also. A spray gun with a long nozzle, mounted on a sliding rack, was inserted into the cavity. As the case revolved, the spray gun was gradually retracted, resulting in an even coat of black paint on the interior of the case. An acid-proof paint (Army Specification 3-106E black) was employed to protect the cavity walls from corrosion which might result from acids in the powder charge.

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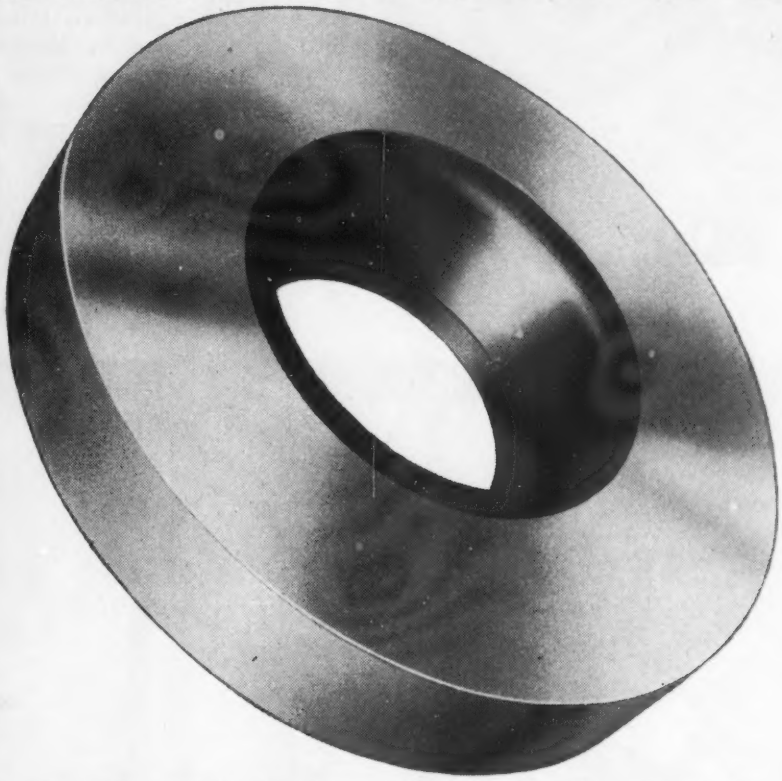

- Long Die Life 1
- Closer Limits 2
- More Continuous Operation 3
- Fewer Rejects 4
- Lower Cost 5
- Better Finish 6
- Increased Production 7

Almost universally used for drawing cartridge cases, and steadily growing in application on a wide variety of other parts, carbide sheet metal dies today have established an amazing record of low cost, high quality performance.

Seven Important Benefits Now Obtained

Well known users consistently report these seven important benefits resulting from Carboloy Die use: Unusually long die life, closer tolerances on drawn parts, more continuous press operation, fewer "rejects", lower cost per piece, vastly improved surface finish—almost "mirror-like" in quality (often this means less buffing time)—and a substantial increase in output per press.

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For your convenience, the coupon may be used to obtain specific information with regard to the benefits of Carboloy Die use on your sheet metal drawing application.

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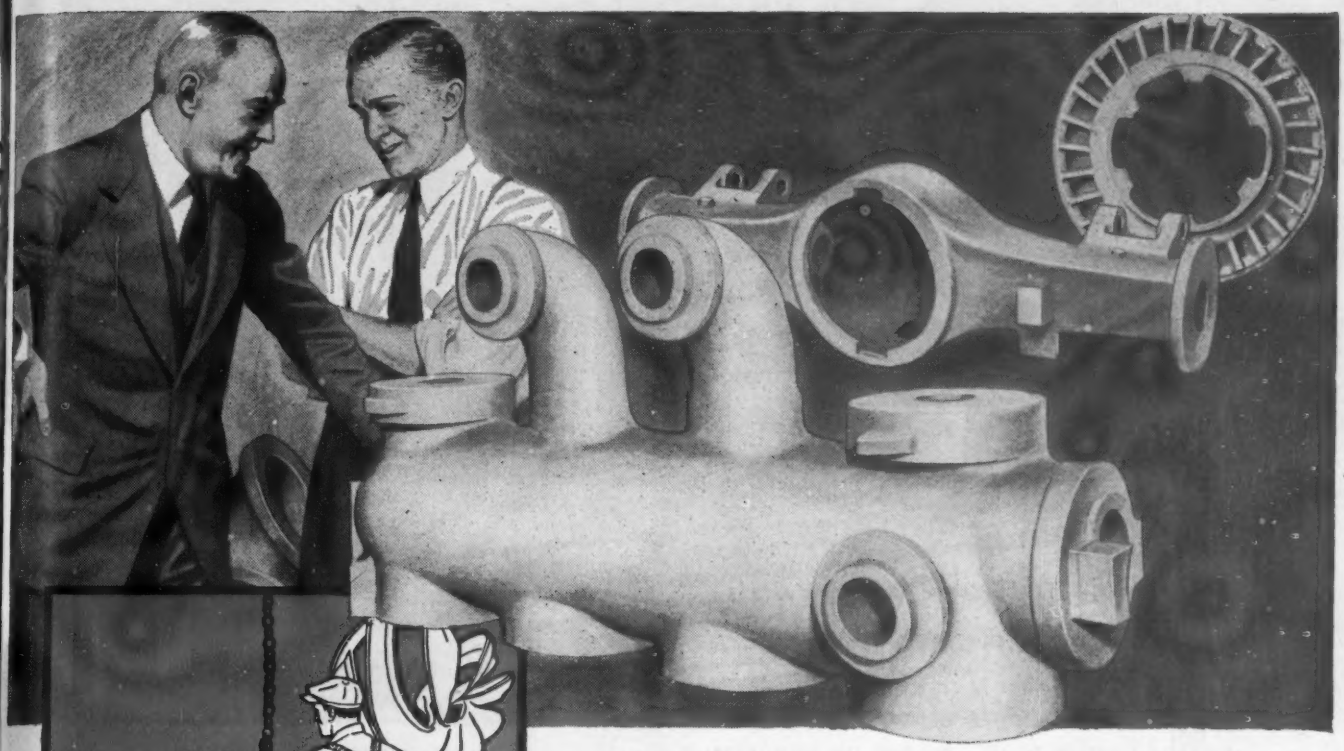
FOURTH part of this process which insured the arrival of shell on fighting fronts in undeteriorated condition prepared cases for the olive drab exterior coating. Here masking strips were being placed over the bourrelet for protection against the fast-drying lacquer, developed by Sherwin-Williams Co., Cleveland. Cases then were hung nose up on an overhead conveyor line which passed into a spray booth.

FIFTH station on the finishing line was the spray booth where olive drab lacquer (Army Specification 3-162C) was applied. About 10 sec were required to coat each case, and it was dry enough to be handled in approximately 1 min, or by the time it had traveled 25 ft on the conveyor line.

SIXTH, and last stage, of the finishing sequence was the final inspection table. Here the masking strips were removed, the underlying metal was polished, and the case was given a final check for imperfections. The bourrelet was oiled to prevent rust, and a light coat of grease was applied to the threads of the tail end. Cases then were packed and shipped to arsenals where they were loaded and fused.



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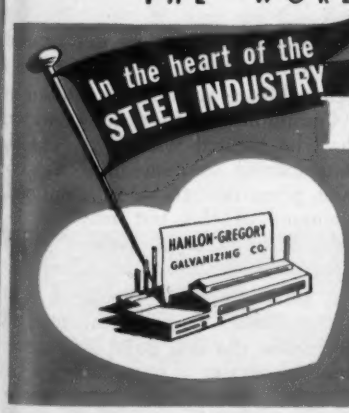
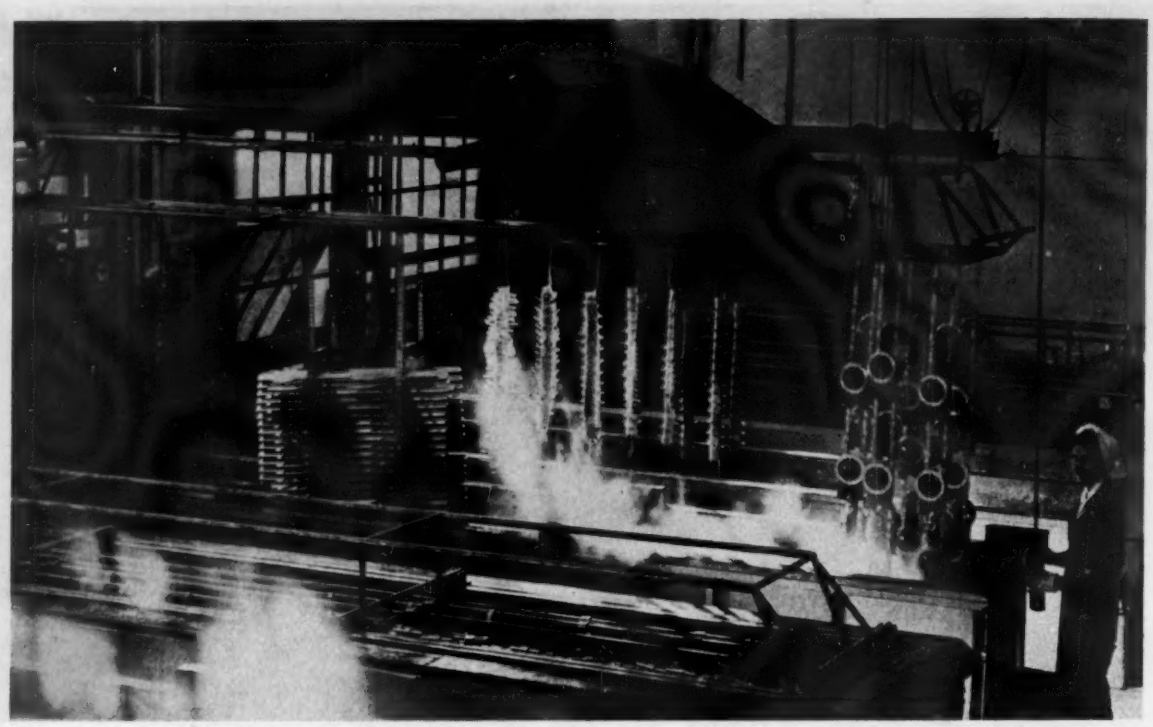


HANLON-GREGORY GALVANIZING COMPANY

Pittsburgh, Pennsylvania



Rack of anodized aircraft parts is lifted from bath at Boeing Aircraft of Canada Ltd.

Short Cycle Anodizing

. . . developed and practiced at Boeing Aircraft of Canada Ltd., uses less power and chromic acid, in addition to shortening time for operation to 20 minutes

ANODIC oxidation of aluminum and its alloys, known and valued for its special qualities of corrosion resistance, electrical insulation, and as a pretreatment for painting, has become even more valuable with the introduction and successful operation of "Cabac" Boeing short cycle anodizing. While its development attained the production stage a little over 2 years ago, details of the finishing process—available during the war without restriction to Canadian and United States manufacturers—were made known only a few months ago.

With intensification of the war effort, the time element in existing anodizing processes became an increasingly critical factor. An American process approved by the Navy's Bureau of Aeronautics and designated PT19 requires 35 min to complete. The British Bengough-Stewart process DTO910A, developed in 1924 for the protection of duraluminum seaplane parts from corrosion by sea-water, is a 60-min operation.

According to Andre Baudat, equipment engineer, Boeing Aircraft of Canada Ltd., Vancouver, B. C., who collaborated with company's control supervisor, George Maynard, in developing the Cabac procedure, the latter not only reduces to 20 min the time required for completely anodizing aluminum alloys, but also affords the means for decreasing power consumption 40 per cent as compared with PT19, and over 74 per cent as compared with DTD910A. Chromic acid consumption, under Cabac Boeing control, is 54 per cent less than with the American process, and 70 per cent less than the British. Cabac-anodized material has readily passed salt spray tests prescribed in U. S. specifications AN-QQ-A-696A and AN-QQ-S-91.

The short cycle process, which by its record earned the approval of the Royal Canadian Air Force and of resident inspectors of U. S. naval aircraft, conforms in some details to the Navy's specification PT19, but differs with respect to voltage cycle, solution and temperature. As outlined by Mr. Baudat, procedure is as follows:

Solution: The solution shall contain not less than 3 per cent nor more than 5.5 per cent of hexavalent chromium, and shall contain not less than 1.75 per cent of free chromic acid.

Temperature: Bath must be thermostatically controlled at 98°, plus or minus 10 to 20°.

Voltage Cycle: Voltage is increased from zero to 40 v in 10 min; held at 40 v for 5 min; stepped up from 40 v to 50 v in 3 min; and held at 50 v for 2 min.

Other process details are in accordance with U. S. Navy specification PT19.

Anodic Solution Maintenance: New solutions at commencement shall be 3 per cent solution of chromic acid, 99.5 per cent in water substantially free from chlorides and sulphates. Chlorides should be held to minimum of 0.02 per cent, and sulphates to minimum of 0.05 per cent. The bath must be regenerated with ½ per cent CrO_3 when free chromic acid content falls to 2 per cent. Five such regenerations must be made in this manner until the total chromic content is 5.5 per cent and free chromic acid is 2.5 per cent. Thereafter, the bath shall be maintained by a daily addition of CrO_3 as the free chromic acid value falls below 2 per cent.

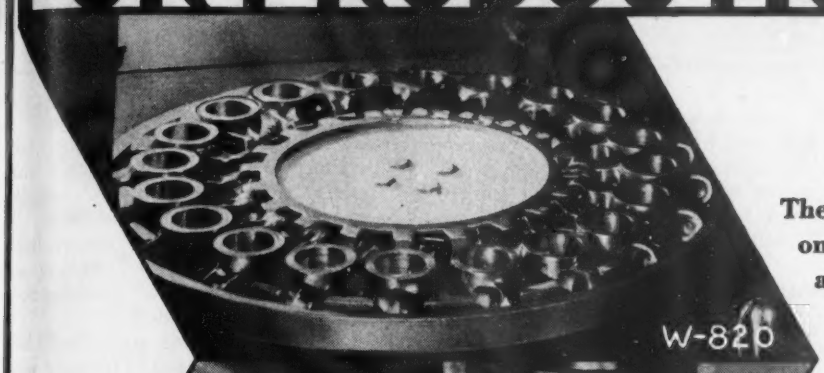
Free chromic acid shall be determined by the following tests:

> Ten milliliters of solution, diluted to 100 milliliters with distilled water, shall be titrated with N/2 Na_2CO_3 standardized solution until a very faint, permanent turbidity is noticed. Accuracy of this test may be increased by use of Nessler tubes comparing against a standard.

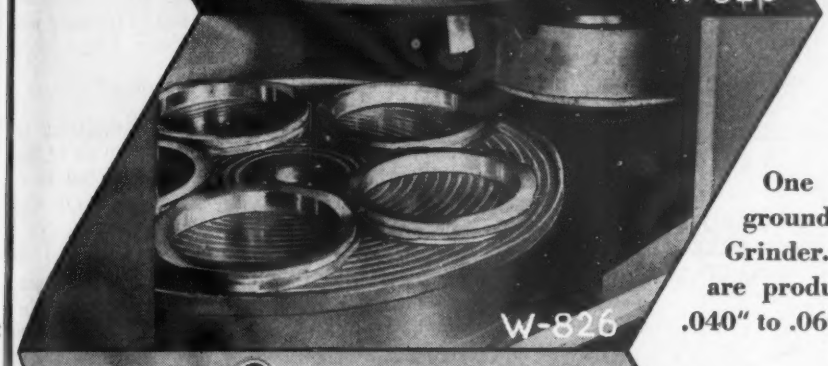
If a glass electrode Beckman pH tester is available, the following method of determining the end point will prove even more accurate:

Titration carried out as previously

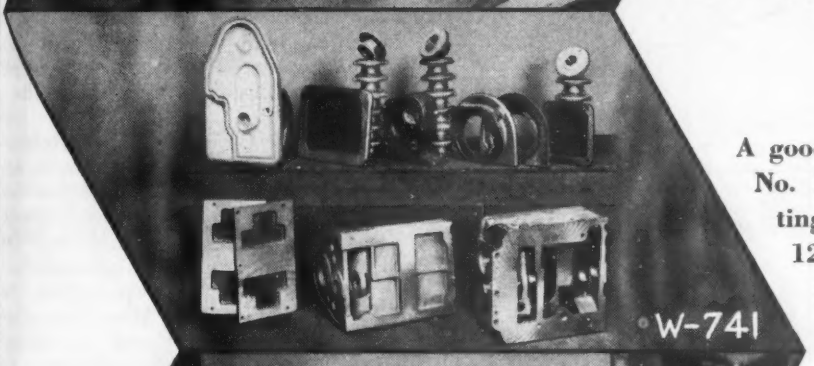
FOR PRODUCTION PUT IT ON THE BLANCHARD



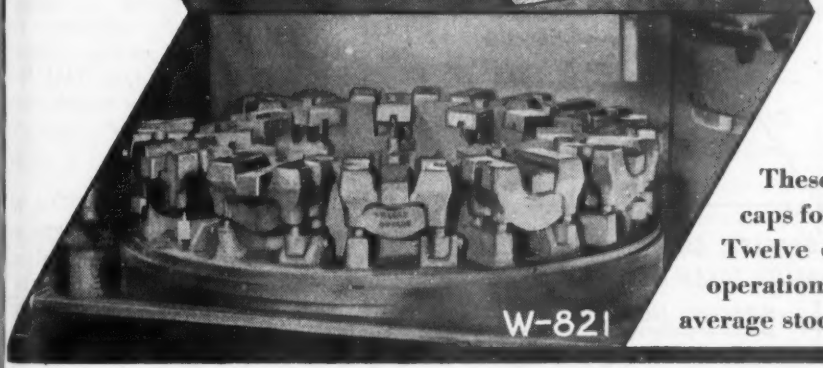
These steel forged rocker arms are ground on a No. 11 Blanchard Surface Grinder and 1800-2000 pieces are produced per eight hour shift, stock removal .005" to commercial limits.



One of many airplane engine parts ground on the No. 18 Blanchard Surface Grinder. 109 of these nickel steel cams are produced per hour, stock removal .040" to .060", to ± .001".



A good example of the way Blanchard No. 18 Surface Grinders are eliminating hand scraping. Fifteen Gear boxes 12" x 12" x 3" or 30 surfaces are ground per hour, removing .070" each side for oil-tight joints.



These nickel steel forgings are bearing caps for the master rods of radial engines. Twelve of these caps are ground in one operation requiring only 27 minutes, average stock removal .075".

Send for your free copy of "Work Done on the Blanchard", third edition. This new book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.

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plotted against pH, using the Beckman tester. Values determined at shoulder of titration curve will be the end point. This has been determined as pH 4.0 plus or minus 0.5.

CCS. $\frac{N/2\ Na_2CO_3}{2}$ = per cent W/V free chromic acid.

Tests should be undertaken to make certain that the hexavalent chromium, trivalent chromium, and dissolved aluminum contents of the bath do not alter appreciably after solution reaches the 2 per cent chromic acid content reached immediately following the fifth regeneration. Free chromic acid content may be determined by the electrometric pH as obtained on the Beckman pH tester, but this method is not always reliable.

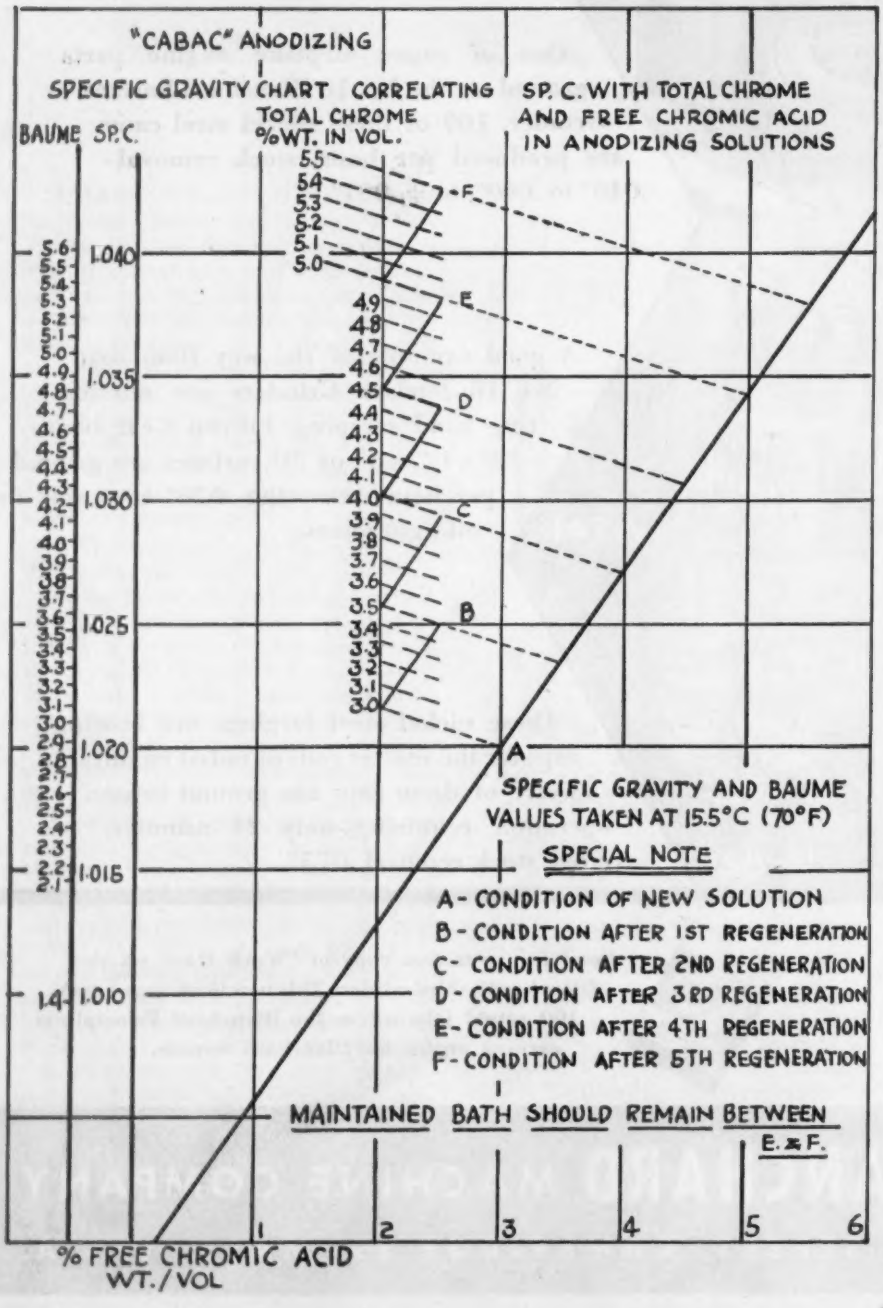
Tests should be directed toward maintaining values shown in the accompanying table. Solution never should be permitted to go below 1.75 per cent of free chromic acid. If such a danger exists, a daily maintenance schedule should be devised and followed. Conductivity of solution must be such that current density at the end of the 40 v shall not be less than 1.50 amp per square foot for 24ST material. Accompanying specific gravity chart will be of assistance in finding total chromium content, provided free chromic acid content is known.

ANODIC SOLUTION MAINTENANCE

Titration Value $N/_2Na_2CO_3$	Free Chromic Acid	Solution to be replaced with water	Chromic Anhydride to be added after solution is made up to level with water
3.8 mls	1.9%	1.8%	0.1017%
3.7 mls	1.85%	2.7%	0.1526%
3.6 mls	1.8%	3.6%	0.2035%
3.5 mls	1.75%	4.5%	0.2543%

In operation and maintenance, the following precautions should be observed:

1. All contacts between bus bars and the work must be kept clean and polished free of all oxide.
2. There must be a good electrical contact between work racks and parts; this contact must be free of previously formed anodic film.
3. In racking parts, overloading should be avoided; and racking so closely that electrolytic blanking occurs must be avoided.
4. Anode to cathode area should be not less than 1:1, but preferably not more than 2:1.



Left—Specific gravity chart like this is helpful in finding total chromium content

Pre-Anodic Cleaning

Success of short cycle anodizing is dependent upon adequate cleaning of the parts. The following procedure has been used successfully by Boeing Aircraft Co. of Canada Ltd. for over 3 years:

Degreasing — It is essential that all parts be precleaned to remove the bulk of the oil and grease. This may best be accomplished by (a) vapor degreasing, using stabilized trichlorethylene (preferred) and by (b) soaking in an approved organic water soluble grease solvent, followed by rinsing in clean water (alternate).

Hot Alkali Cleaning—After precleaning, the parts should be soaked in an approved inhibited alkali cleaner but for exceptions listed. Alkali cleaner must necessarily be of high efficiency as thorough cleaning must be accomplished in less than 10 min to keep up with the short cycle anodizing. Many manufactured cleaners now offered are acceptable. However, should difficulty be experienced in finding a suitable cleaner, the following Boeing formula BAC No. C2A will be found quite satisfactory and very economical:

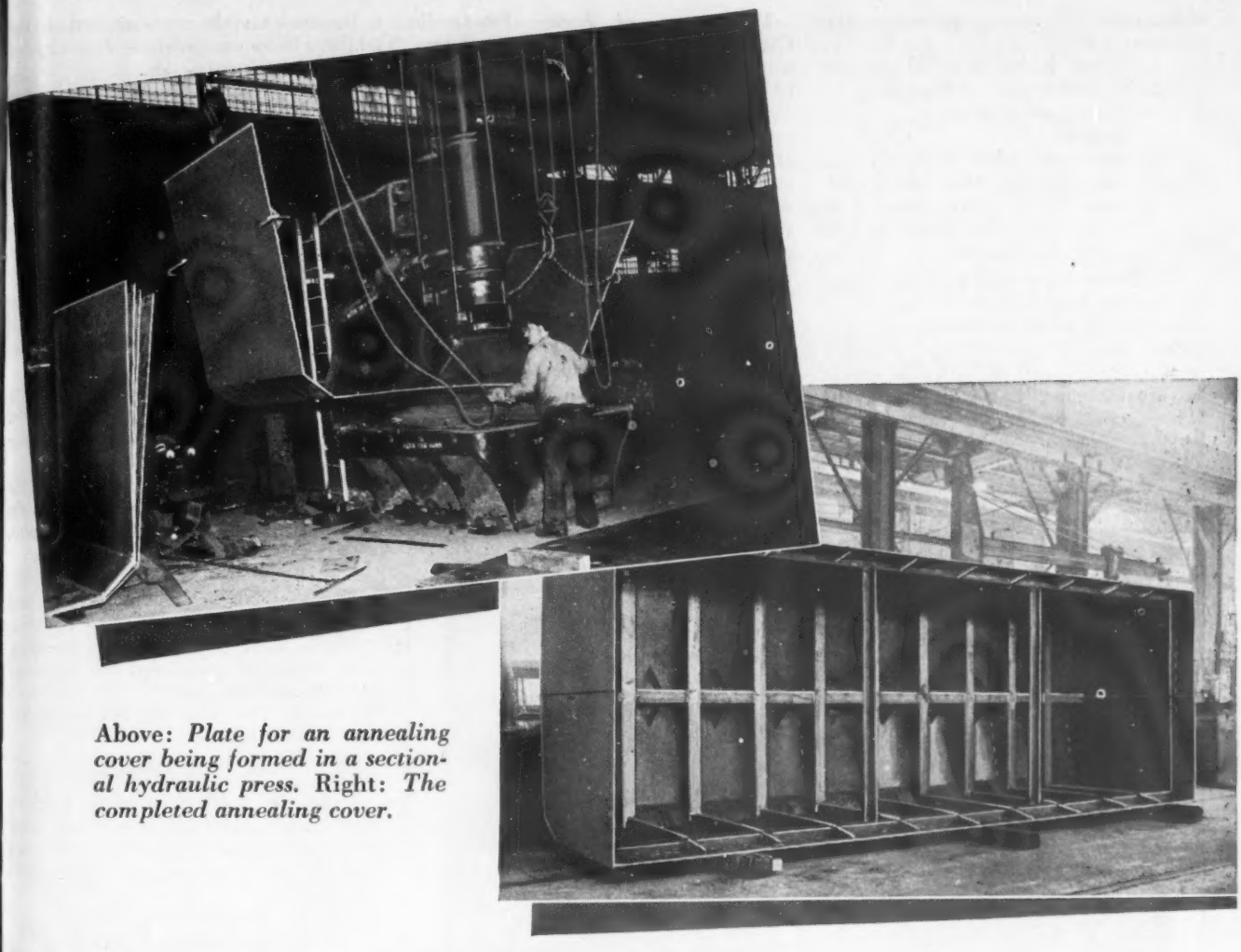
Sodium Metasilicate	3 oz
Sodium Hexametaphosphate (Calgon unadjusted)	¼ oz
Nacconal NR	1/10 oz
Water to make	1 Imperial Gallon.

Operate at 180° F plus or minus 10° with slight air agitation. The solution may be maintained according to the tests to be described.

The following precautions should be observed in using any pre-anodic alkali cleaner:

1. Parts must be completely submerged in solution.
2. Previously anodized parts should not be cleaned in the pre-anodic alkali.

The following parts should be precleaned only when followed by a hot



Above: *Plate for an annealing cover being formed in a sectional hydraulic press.* Right: *The completed annealing cover.*

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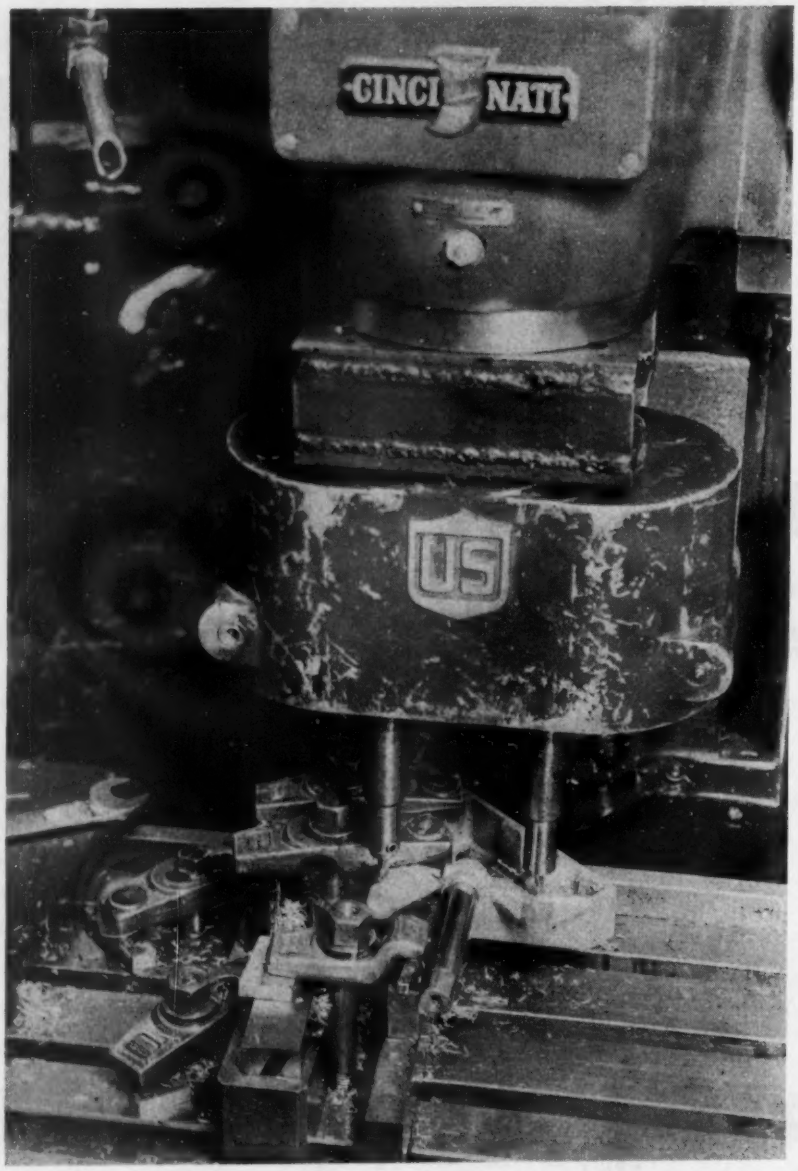
water rinse, eliminating the use of the pre-anodic alkali:

1. Tightly folded or rolled sections.
2. Welded or spot welded parts.
3. Riveted assemblies.
4. Castings.
5. Bent tube stock or drawn section which by their shape may cause excessive carry over of alkali into the rinse heater or into the anodic solution.

Hot Water Rinse—All parts then must be thoroughly washed in clean hot water (125-140° F) which is changed at a sufficient rate to prevent the alkalinity from exceeding pH 8.5. If this cannot be accomplished, the parts should be washed clean with a hot water shower spray.

Maintenance of Boeing Pre-Anodic Cleaner BAC No. C2A—The solution, when freshly prepared, should have a pH of 12.6 when using the Beckman pH tester with an E glass electrode. Ten milliliters of the solution diluted to 100 ml, when titrated with N/10 HCL, shall require for neutralization not less than 20.0 mls, using methyl orange indicator and not less than 12.50 mls using phenolphthalein indicator giving the total and active alkalinities respectively. The bath shall be considered to be depleted when the active alkali titration value drops below 9.3 mls and may be regenerated with 25 per cent of the original materials. Two such regenerations only may be permitted. The solution should be completely renewed if it becomes unduly contaminated or the inhibitor becomes depleted—as evidenced by slight corrosive action.



DOUBLES OUTPUT: Under a previous method of milling two slots in an angle brace, it was necessary for operators on this job at Glenn L. Martin Co., Baltimore, to line up the milling machine table individually for the cutting of each slot. Welding a holding plate to an adjustable drill head so that it could be mounted on the machine made possible simultaneous milling of both slots, with a time saving of 62 per cent on this operation

Stripping of Splines

Anodized hangers, splines, coil springs, etc., must present a good electrical contact with the parts. Sanding of contact points is permissible, but this is not considered very economical. The following are two efficient and economical stripping methods successfully used by the company:

Method A—

1. Immerse in caustic strip BAC No. S2 at 180°F plus.
2. Rinse in cold running water.
3. Immerse in nitric strip BAC No. S3 at room temperature and rinse in cold running water.

Method B—

1. Immerse in chromic phosphoric strip BAC No. S2 at 180° F plus, for 10 to 30 min.
2. Rinse in cold water.

The solutions in both methods A and B must be regularly tested to maintain strength. Method B, although considerably slower, is considered the better of the two methods, since it will only strip the anodic film and will not attack the base metal itself.

BAC Strip Formulae

Make up with the water cold or luke warm, add caustic slowly, and wear rubber gloves and goggles when weighing and rinsing. These are main precautions for handling formula which follows:

BAC S2 (Caustic Anodic Strip)—

Sodium Hydroxide (92 per cent plus)	6 oz
Water to make	1 Imperial Gallon

Use at 180° F plus.

Use goggles, apron and rubber gloves when adjusting strength or making new solution of the following:

BAC S3 (Nitric Anodic Strip)—

Nitric Acid (Spec. gravity 1.4)	80 fluid oz.
Water to make	I Imperial Gallon

Use at room temperature.

BAC S8 (Phosphoric Strip)—

Chromic Acid	4 lb
Potassium Dichromate	8 oz
Phosphoric Acid	112 fluid oz
Nacconal NR	1 oz
Water to make	10 Imperial Gallons

Use at 180° F plus.

Many Uses for Magnesium Anticipated

A booklet describing magnesium, available from Revere Copper & Brass Inc., New York, defines magnesium as a metal found abundantly all over the world which, when combined with other metals such as zinc, manganese, and aluminum, is transformed into high-strength engineering material. Postwar applications predicted are in airplanes, railroad cars, truck bodies, passenger automobiles, engravings, tools, elevator cages, scales, furniture, vacuum cleaners, baby carriages, scooters, sleds, sewing machines, ash cans, stepladders, etc.

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well beyond previous limits

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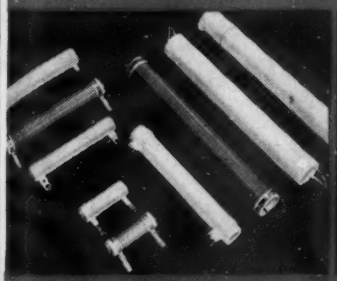
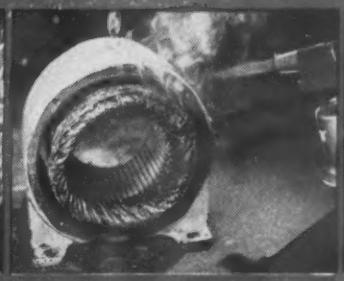
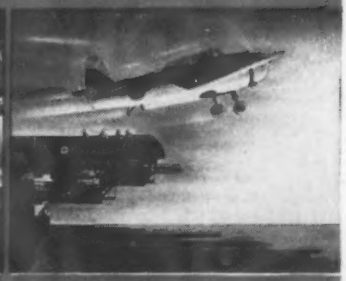


SILASTIC-COATED RESISTORS operate successfully at 275° C. . . . quality under Grade 1, Class 1 specifications by taking the plunge from 275° C. into ice water nine successive times. Silastic is available in coating, extruding and molding stocks.

DC STOPCOCK GREASE, HIGH VACUUM TYPE, effectively seals and still prevents freezing of stopcocks and other ground glass joints under high vacuum. This new high vacuum silicone grease is recommended for use over a temperature range of -40° F. to 450° F.



DC SILICONE INSULATION will not support combustion! Pictured are DC 993 varnished Fiberglas and mica insulated stator coils seven seconds after five-minute exposure to direct flame of a gasoline blow torch. As a result of this non-combustibility fire hazard is reduced.



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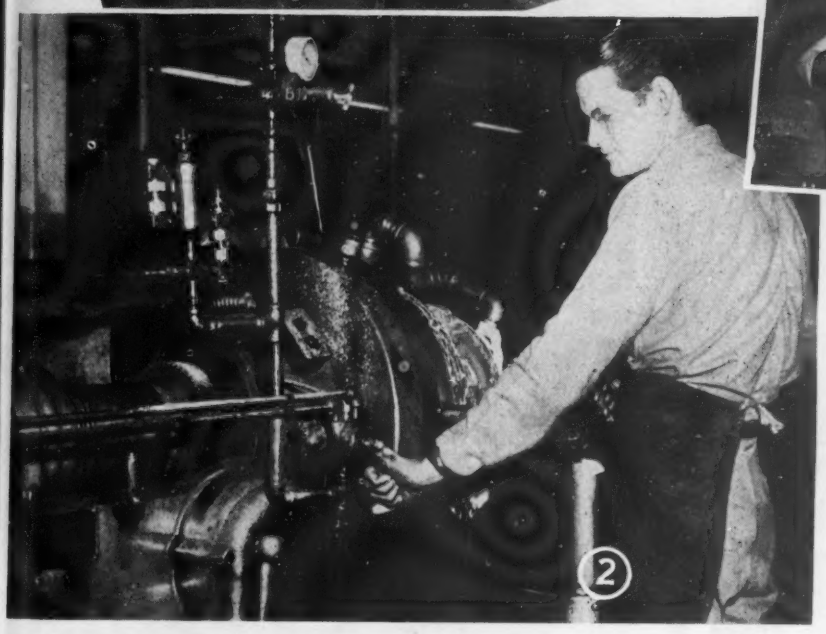
Air-Powered Tools

figure heavily in Eaton Mfg. Co.'s production of truck axles and aircraft crankshafts



TYPICAL example of a single factor which contributed along with many others to the making of recent production miracles is the application of compressed air in a variety of industrial uses.

Eaton Mfg. Co.'s Axle Division, Cleveland, where truck axles and aircraft crankshafts are made in quantity, is one company which has made extensive use of pneumatic tools and equipment, as may be seen in illustrations with this article.

Characteristic of this activity in the three plants of the Axle Division is the operation shown in Fig. 8. Here, one worker drives studs in an axle housing (left), eight at each end, with an air-operated wrench, while another man (at right) screws down the housing cap with an air wrench. As the axle travels down the production line, air also will drive the tools for the 12 bolts in the trunnion yoke housing, tightening the two spindle studs, building the differential, grinding and polishing, and many other operations.

The air-operated tools for assembly do the work in seconds compared with the minutes which would be required by hand operation. The tools are light and easy to handle, reducing end-of-the-day fatigue for workers and also space requirements for storing them.

One Man Production Line

A one-man production line, with the worker moving from machine to machine, means extra production too. This is the way it is done in one case. The differential carrier, of malleable iron, is chucked in the lathe first, as shown in Fig. 2. An air-operated chuck makes the move almost instantaneous. Then the operator burrs and chamfers the piece last removed from the lathe with an air motor, thus eliminating the need for a

drill press, and goes on to two more machining operations.

Turning, hammering, drilling and chucking are some of the many tasks being performed at Eaton with the aid of compressed air. Lifting is another. Air-lifts of the type shown in Fig. 3 enable workers to move quickly heavy axles and other parts to production lines and on to an ulimate flow for ultimate assembly in vehicles. Note stack of axles at left of worker.

Lifting and lowering metal working tools is another application for compressed air, as shown in Fig 6 where a heavy, multiple drill press at work on an axle shaft employs air for quicker and easier moving of the drill press head seen in photo.

Uses for compressed air similar to those found in the axle plant also may be found in the aircraft crankshaft and propellor shaft plants of the division. Another application, illustrated in Fig. 5, is in the numerous ways that light, air-operated tools are used for polishing and grinding. Girl operator is seen polishing oil holes in a propeller shaft flange while seated. Compressed air, with its high speed and resiliency, is a type of power approved for this delicate operation.

Still another polishing operation is shown in Fig. 1. Here, the worker is polishing the radius on a bearing retainer ring, using an air motor. Roughing also is done with air-operated grinder before the retainer ring goes to receive the final polish.

Air power is used in many spraying operations. Fig. 7 shows one of these. The operator is washing a completed aircraft crankshaft and at the same time covering it with a protective coating of oil by spraying on a solution with the aid of a compressed-air-operated spray gun.

Additional Applications

In instances where one man operates more than one piece of equipment, it frequently is found that the equipment employs air in some way to aid the operator. One example has been mentioned. There are several more. As the bearing retainer ring is removed from a hardening furnace, curtain of flame is thrown over the furnace door to retain furnace atmosphere. The flame is produced by automatically releasing a combination of compressed air and gas as the door lifts, maintaining temperature by preventing entry of outer air.

The hardened retainer ring is taken from the furnace to a circulating oil press (Fig. 4), to bring it to exact size. The die of the press is driven down on the ring by compressed air. Several hardening furnaces and presses at the plant employ compressed air in a similar manner.

Eaton's Axle Division, which through the war period employed 3500 persons, is only one part of company's operations in plants in seven cities. Although primarily a supplier of metal parts to automotive and aircraft industries, Eaton also produces in volume parts for railroads, household appliance manufacturers and many other industries.

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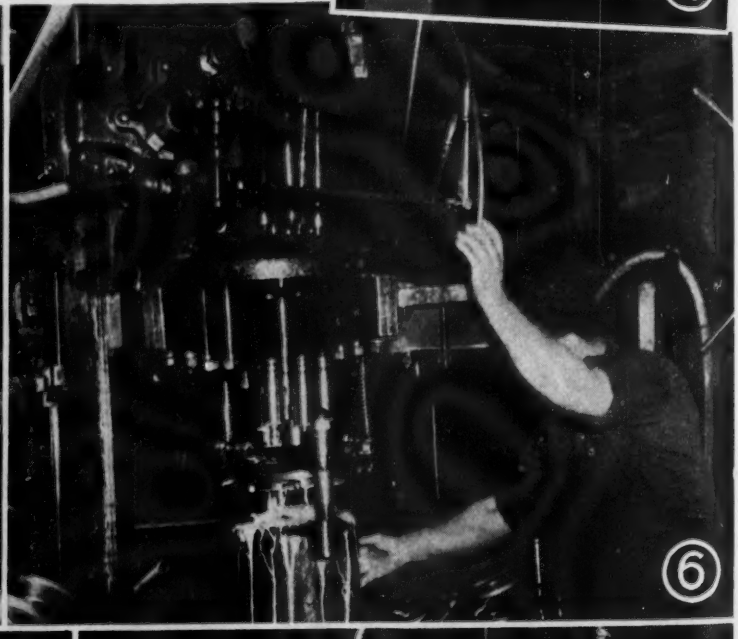
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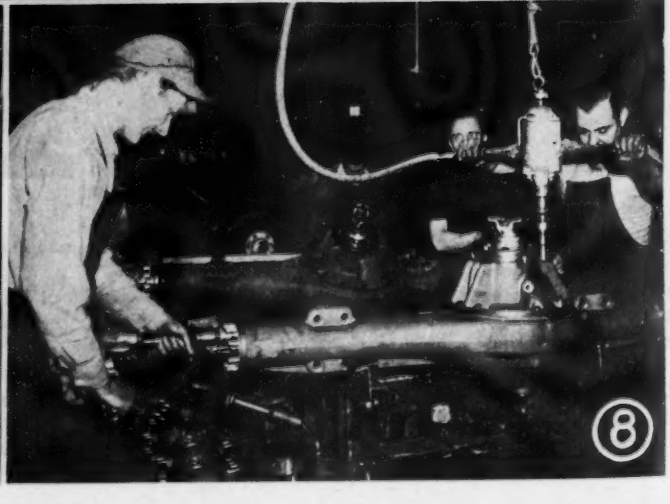
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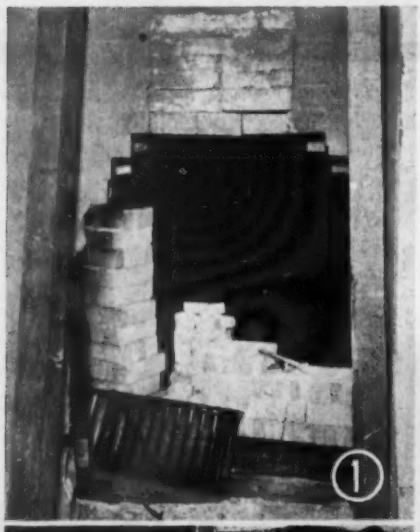
Procedure for Making Major Repairs to HOT BLAST STOVE



Extensive damage to checkerwork of blast furnace stove serving a stack in the Chicago district is repaired by simple and safe method. Two door-size openings cut into the shell and lining expedite movement of material. Large saving in materials, labor and idle stove time is effected

By ROBERT V. HUFFMAN
Youngstown Sheet & Tube Co.
Indiana Harbor, Ind.

INASMUCH as many of the stoves at blast furnace plants today are reaching what might be call middle age, it may be that repairs will be necessary similar to those recently completed at the Indiana Harbor works of the Youngstown Sheet & Tube Co. Perhaps industry may derive some benefit from the procedure followed in 1944 of repairing the main and secondary arches and checker rider tile supporting the checkerwork of a blast furnace stove.

This 24 x 103-ft stove built in 1925 has a side combustion chamber and 5¼-in. square checker openings. It is equipped with Steinhart burners and is heated with primary washed blast furnace gas. Except for minor repairs to piers, arches, etc., periodically, this stove has seen continuous service. It was last inspected and touched up during the relining of the furnace in Nov. 1942. At that time two piers, two large arches, 12 small arches and a few of the checker rider tile were repaired. There are three other stoves of like design and built at the same time.

It is not the purpose in this paper to attempt to establish the blame for the conditions of this stove, but to outline the precautions taken and procedures followed in protecting the men and in preventing further damage to the stove.

This stove had not given any trouble, normal heats were being maintained and only by chance was its condition discovered. In making repairs on a faulty chimney valve a considerable number of loose brick were noticed in the bottom of the stove. Upon opening the clean-out doors this condition seemed to be general over a large part of the stove.

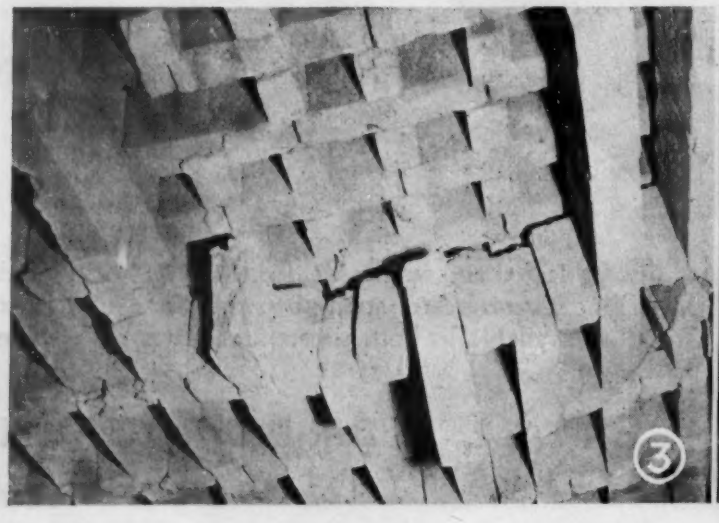
Fig. 1—Door-size openings were cut into stove to speed movement of materials

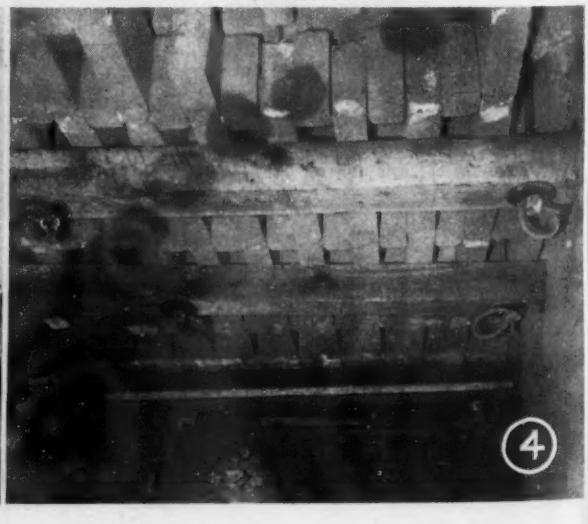
Fig. 2—Closeup of split pier and unattached shield

Fig. 3—Looking upward at unsupported checkerwork

Fig. 4—Oak timbers and cables that were employed to support the furnace checkerwork

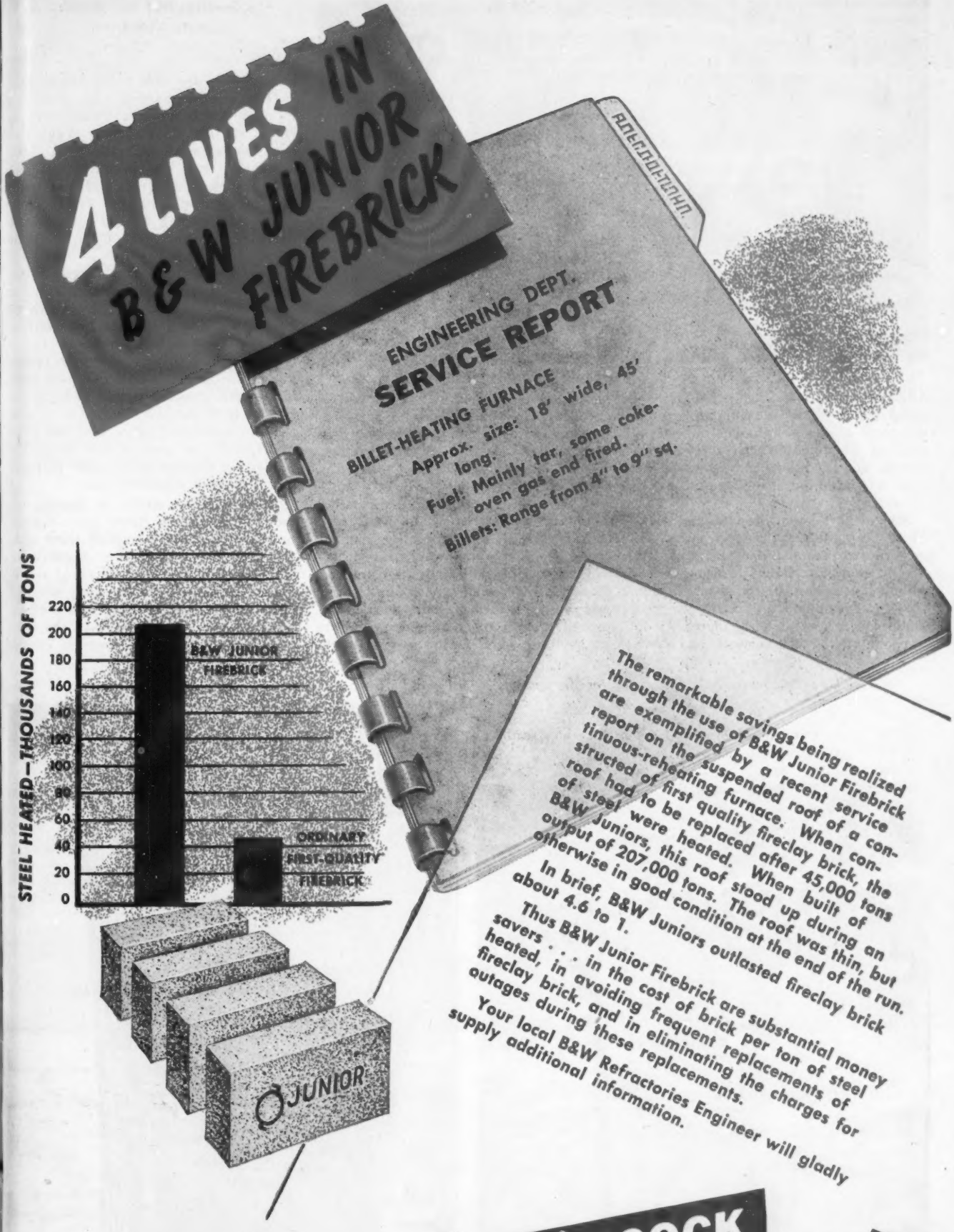
This paper was presented before the meeting of the Blast Furnace and Coke Association of the Chicago District, May 22. It was awarded second prize in the blast furnace section of the fourth annual technical papers contest sponsored by the association.





STEEL HEATED—THOUSANDS OF TONS

4 LIVES IN B&W JUNIOR FIREBRICK



The remarkable savings being realized through the use of B&W Junior Firebrick are exemplified by a recent service report on the suspended roof of a continuous-reheating furnace. When constructed of first quality fireclay brick, the roof had to be replaced after 45,000 tons of steel were heated. When built of B&W Juniors, this roof stood up during an output of 207,000 tons. The roof was thin, but otherwise in good condition at the end of the run.

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Thus B&W Junior Firebrick are substantial money savers . . . in the cost of brick per ton of steel heated, in avoiding frequent replacements of fireclay brick, and in eliminating the charges for outages during these replacements.

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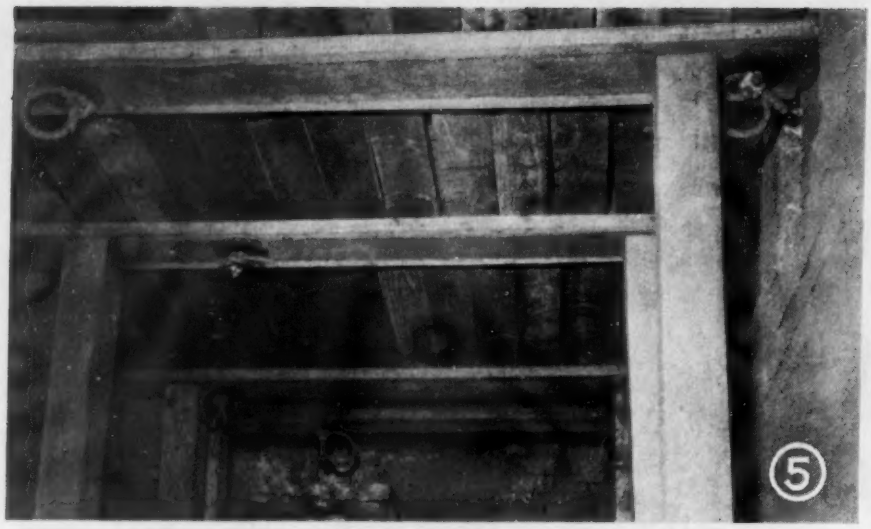


Fig. 5—How roof was installed to protect workmen

After as many bricks as possible were raked out a closer inspection indicated that most of the posts under the checkers had disintegrated and the balance was in bad condition; consequently, the stove was taken out of service as a matter of safety.

Several days later, after the stove had cooled sufficiently, further inspection showed that extensive damage was done. The question was: Could this stove be repaired, considering the safety of the men and the possibility of doing a good sound job, or would it be necessary to tear out all the checkerwork and completely rebuild the stove from the bottom up? If it could be repaired a considerable amount of money could be saved in both materials and labor. Furthermore, furnace practice would be penalized a minimum amount from lost heat.

Representatives from all participating departments were called in conference and ideas as to the best possible method of doing this repair work were thoroughly discussed. Finally the method shown in the accompanying illustrations was presented to management which approved it with the admonition, "not to let anything stand in the way of safety in respect to the task which lay ahead."

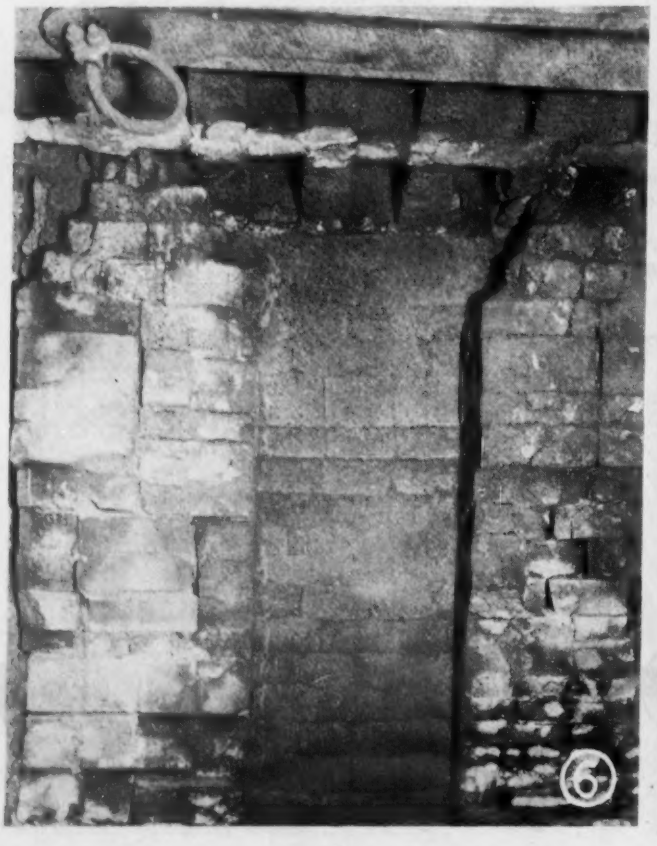
Due to the size of the manhole through which workers would have to crawl into the stove, it was decided to cut two openings into the stove 180 apart and door size in order to afford quick entrance and exit and also speed up movement of materials. Fig. 1 which shows this opening looking out from the inside of the stove, was taken after the stove job was under way.

How the disintegration of one of the piers appeared when the entry was opened is shown in Fig. 2. About 65 per cent of the supporting brickwork of the stove was in bad condition. Fig. 3 is a view looking upward at the unsupported checkerwork. All that was holding up this immense weight of brick was the force of the load from side to side, the few remaining piers, and the brick attached to the shell of the stove. Fig. 2 shows a closeup of the split pier and the pier shield wrenched free.

Work then was started in cleaning out the bottom of the stove, removing the broken arches and rebuilding them without dislocating the entire checkerwork. All material that could be raked out of the stove through the door was removed from about one-half of the area of the bottom of the stove. Only half the stove was cleaned because it was not consi-

Fig. 6—Tie-in arches were made ready for the masons later on

Fig. 7—How repair job appeared when stove was ready for service



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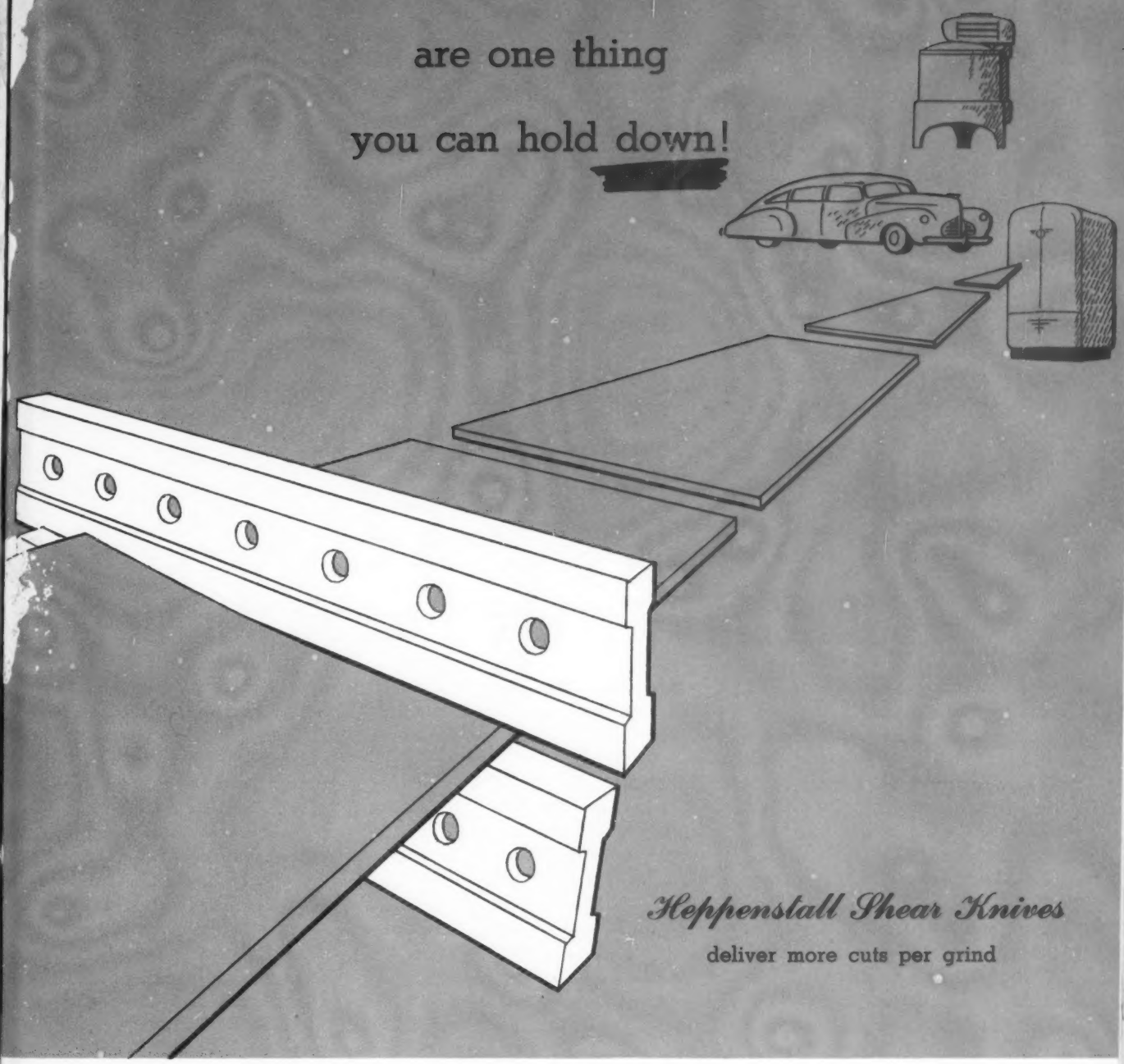

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How MUREX FHP licked a tough job for us

Friends, did you ever know it to fail? I mean, just when your department gets running along smoothly, in marches a rush-rush job that they want done practically yesterday.

Take what happened to us last week: forty big engine bases that had to be fabricated right away, if not sooner—and each of them requiring 3860 lineal inches of welding. Tommy, our boss, took one look at the due-date on the job, and groaned.

"Okay," he said at last, trying to look cheerful. "Can do, I hope."

But after two units, we saw we'd never make it. They took 12 hours of welding time each, whereas we needed to make 10 hours or less to finish on schedule.

Whereupon I stepped up to Tommy, observing, "Look, I'm only a girl welder, and new around here anyway. But why are we using ordinary *all-purpose* electrodes on this job, when MUREX FHP would knock it off in very much less time? The last place I worked specialized in the fabrication of heavy bases and machine frames. We always used MUREX FHP on this sort of thing. Why don't we position these frames and . . ."

Tommy looked at me oddly. "Say no more, sister," he said. "Say no more. I should have seen right off the bat that this is a natural for downhand welding and good old MUREX FHP. But we were in such a rush, and I wanted to use up our stock of E6010 rods, and . . ."

The next day, a load of MUREX FHP came in. The first assembly was finished in *eight* hours as against the twelve the other rods took—*a saving of over thirty per cent!*

And, the MUREX man did us another good turn, by giving us a big new Wall Chart, which lists and classifies all of M&T's 30-odd electrodes. Now, when a new job comes in, Tommy consults the chart carefully to see which MUREX rod is the one to use...and he says we've saved lots of headaches that way.

If you have anything to do with arc-welding, you'd better send for the new Wall Chart for yourself. Just address:

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MUREX Electrodes

ered safe to attempt to do the entire bottom surface at once.

After the loose material had been raked out of the bottom, the riggers prepared to support the checkerwork. Working from the top of the stove 5/8-in. cables were dropped through predetermined checker openings. These cables were made long enough so that long handled hooks could be used in drawing them from the bottom of the stove out through the temporary door where they were run through holes drilled at the ends of 6 x 9-in. oak timbers.

These oak timbers were then drawn up tight against the bottom of the checkerwork, as shown in Fig. 4, and when the cables were taut they were fastened to the top of the stove. Then upright shores of 6 x 6-in. oak timbers were placed against the horizontal timbers beneath the checkerwork, and wedges were driven in at the foot of these timbers, making them solid.

Up to this time the men had not entered the stove but now the men felt safe in walking in and out of the stove. However, one further precaution was taken. Although, all men working in the stove wore hard hats, it was felt that even a small piece of brick might come down and injure someone. Therefore, 2 x 2's fastened to the cross oak timbers and 1 x 6-in. pine boards laid on these 2 x 2's, (Fig. 5), afforded a roof above the heads of the men who would have to work in this chamber.

Main piers and arches were now laid in the usual manner but it had been previously decided that the small arches would be replaced with tile. It had been foreseen that it would be extremely difficult to construct small arches in the customary manner and still have a snug fit under the checkers, so in order to obtain a more solid job two tile 33 x 12 x 3-in. were placed adjacently. These tile were set snugly against the bottom of the brickwork and undoubtedly will last the life of the stove.

Work on the second half of the bottom of the stove proceeded in the same manner as in the first half. More weight was found to be resting on the remaining piers in this half of the stove and it was necessary to proceed cautiously in placing the shoring and removing the piers. The shoring was placed so that when the brickwork went up the shoring would not interfere with the brick. Cross timbers attached to the cables stayed in the stove until all brick had been laid. Some of them could not be removed and were left in to be burned. Only one shore was out of place and this had to be jacked over 2 in. The placing of the horizontal timber was an important phase of the work and required much care.

Fig. 7 shows how the repair job looked after the upright shores had been removed and the cross timbers taken out of sight behind the rider tile. Putting on the pier shields, removing the cables, and welding back in place the two plates of the doors, provided a stove now ready for operation at a fraction of the time and cost that rebuilding the stove from the ground up would have taken.

Uniformity in Steam Chamber Sections— Portability, and Trim Appearance Achieved in . . .

All-Welded TIRE MOLD

TYPICAL of the advances being made in welded production machinery for the rubber industry is that of a tire re-capping mold and platen press formerly made of cast iron. It now is fabricated by arc welding at a 50 per cent reduction in weight and is said to operate very efficiently.

Not only did welded design bring about the weight-saving advantages of easier portability and trim appearance, but, according to the manufacturer, Thor Mold & Machine Co., Akron, O., fabrication from standard steel shapes insured absolute uniformity in thickness of steam chamber sections including faster heating and eliminating undue strains inherent in other construction.

Views of the welded tire mold are shown in the photos at the right.

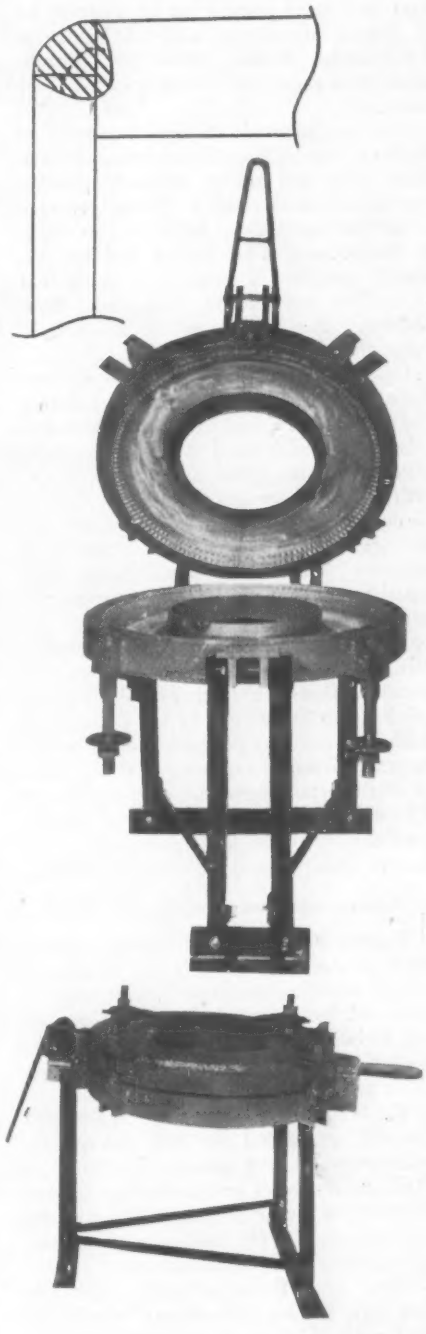
In service, the mold is subjected to a temperature of 312° F and operates at steam pressure of 60 lb.

In approaching welded design, no attempt was made to exactly duplicate former construction. The various parts of SAE 1020 steel simply are cut and shaped to meet functional requirements. Tire contour portion of the structure is press formed, while the other ½ to 1-in. thick plate sections are flame cut and rolled. Made on a production basis, various flat parts are template marked, and suitable jigs and fixtures are utilized for positioning and holding during the welding assembly.

In setting up the welding operations, a sequence of applying the beads was established to overcome excess machining. No joint preparation is necessary, a simple half-open corner joint such as shown in diagram being used throughout. With this type of joint, the "shouldering" effect aids the welding by reducing the tendency to burn through the plates being joined.

Shielded arc electrodes used are of $\frac{5}{32}$ and ¼-in. diameter, with two passes generally required. Rods conform to American Welding Society specifications E 6012. Finish welded joints will withstand up to 185 psi pressure and are tested at 120 lb water pressure.

The tire molds, made in various sizes, require about 120 ft of welding per unit with ½-lb of welding rod used per foot of weld.



Data and illustrations courtesy of Lincoln Electric Co., Cleveland.

RAPID Colorimetric ANALYSIS

. . . . of iron and steel for aluminum and silicon content attains higher accuracy through improved methods

IMPROVED analytical methods for determination of aluminum and silicon in iron and steel should be of interest to steel-mill laboratories and all industrial laboratories dealing with the routine analysis of these elements in iron and steel products.

Previous methods for determination of both aluminum and silicon in steels have been slow and rather painstaking even for experienced analyst. Those recently developed are ideally suited to the needs of the industrial laboratory and the accuracy obtained is reported to equal that of routine gravimetric procedures. Both methods are based on modern, rapid colorimetric techniques.

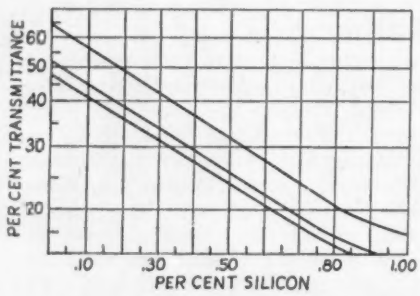
Colorimetric methods of routine analysis have rapidly increased in number during the past decade. Most colorimetric methods have been devised with two objects in mind—namely, speed and the ability to estimate small amounts. Speed is, perhaps through necessity, of the greatest importance to the works chemist and busy analyst. The ability to estimate very small amounts of material, however, is becoming of increasing importance in the control of modern manufacturing methods. Colorimetric means of analysis, in general, consist of treating a solution containing the substance to be determined with a reagent to produce a color which is proportional in intensity to the amount of the substance present in the solution. The color having been produced, several methods are available for comparison with known color-concentration relationships.

Determination of Aluminum in Steels

Present methods for estimating aluminum in steel are slow, even for experienced analysts. Accurate results may be obtained by repeated determinations using elaborate precautions, but for routine analysis, much time-consuming duplications are usually impractical.

C. H. Craft and G. R. Makepiece[1] present a method for the colorimetric estimation of acid soluble aluminum in steels by means of ammonium aurintricarboxylate in the range from 0.04 to 1.5 per cent aluminum. The method was especially developed for routine use.

The dyestuff ammonium aurintricarboxylate, known generally as "aluminon", and readily available, has been used as a confirmatory test for aluminum and for the estimation of aluminum in nonferrous alloys and in water. With aluminum salts in weakly acidic solutions, it precipitates a bright red lake. In extremely small amounts, however, the lake takes the form of a stable sol, which may be used for colorimetric estimation of the aluminum concentration. Method developed by Craft and Makepiece was found satisfactory for the determination of aluminum in steels containing not more than 2 per cent chromium.



Determination of silicon in low alloy and stainless steels: Curve I, (low alloy steels) no chromium; Curve II, (stainless steel) 19% Cr, 9% Ni, 4% Mn; Curve III, (stainless steel) 25% Cr, 20% Ni

Method: In carrying out this method, a 0.5 gram sample of the steel is dissolved using suitable acids. An isopropylether extraction for removal of the iron from solution is described. Procedures then are carried out for removal of silica (if large amounts are present in the sample) and for oxidation of chromium (if present) to the hexavalent state. The prepared solution containing aluminum then is diluted to a definite volume and an aliquot portion (5 millimeters) taken. To this is added 15 millimeters of a composite aluminon reagent. This reagent consists of a 0.100 per cent aluminon solution prepared by dissolving 0.100 gram of aluminon in water, followed by the addition of 10 millimeters of 10 per cent benzoic acid (dissolved in methanol), and diluting the final volume to 100 millimeters. This aluminum containing solution, to which the aluminon reagent has been added, then is examined with a Coleman universal Spectrophotometer (Model 11) and the transmission at 525 microns is compared with that of pure water. Amount of aluminum then can be found by means of a transmittance versus aluminum concentration curve.

Accuracy: Considerable study was carried out by Craft and Makepiece on the effect of interfering elements commonly found in iron and steel products and methods were developed for minimizing the influence of these elements on the accuracy of the method. The precision of the method was checked at the National Bureau of Standards by analysis of two aluminum containing steels as shown in Table I.

According to the investigators, in the case of NBS steel No. 106, the range of values submitted by the co-operating analysts was 1.05 to 1.08 per cent aluminum, while for steel No. 125 this range was 0.25 to 0.27 per cent aluminum. In each case an average of a few determinations by the proposed colorimetric method (Table I) is well within the range given.

It is obvious from the data given that the method compares favorably with gravimetric procedures for aluminum contents of approximately 0.25 to 1.0 per cent. In the range of aluminum content of 0.02 to 0.10, one would expect considerably greater accuracy with the proposed colorimetric method than with

(*Please turn to Page* 156)

TABLE I—PRECISION OF METHOD

Steel	Natl. Bur. of Standards %	Authors' Method %	Error %
No. 106	1.06	Av. 1.07	0.01
		1.09	0.03
		1.06	0.00
		1.08	0.02
		1.09	0.03
		1.09	0.03
		1.07	0.01
		1.04	0.02
No. 125	0.261	Av. 0.262	0.001
		0.261	0.000
		0.258	0.003
		0.268	0.007
		0.259	0.002
		0.266	0.005

TABLE II—ACCURACY OF THE METHOD

Bureau of Standards Sample No.	Type of Steel	Si Actual, %	Si Observed, %	Curve Used
36	2 Cr-1 Mo—0.39 Mn	0.31	0.33	I
135	5 Cr-0.5 Mo-0.49 Mn	0.38	0.41	I
100	1.38 manganese steel	0.19	0.21-0.19	I
101a	18 Cr-8 Ni-0.46 Mn	0.34	0.33, 0.35	II
101b	18 Cr-9 Ni-0.60 Mn	0.48	0.48, 0.51	II
121a	18 Cr-10 Ni-1.38 Mn	0.52	0.51, 0.50	II

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Steel Handling Innovations

(*Continued from Page* 109)

rails that extend out over the siding to facilitate handling heavy loads. Also operating in this bay is a small ½-ton hoist on a monorail bridge with hand traverse and power lift. This unit serves the small slitters in this bay.

Second bay is equipped with three 5-ton cranes. Push-button controls operated from floor levels obviate climbing up into the cab of a crane every time it is to be used. Also floor controls speed the operation of moving and increase safety since the operator is close to the work.

Third bay has two similar 5-ton units; fourth bay, one; fifth bay, two; and sixth bay, one.

Facilities Co-ordinated: Reference to Fig. 4 shows the broad scheme that facilitates handling operations. In general, coiled material is handled in the first two bays, sheet in the third and fourth, and bar stock in the fifth and sixth. Of course, some overlappng is unavoidable, but that's the approximate arrangement.

Effective layout of equipment immediately becomes apparent upon studying the floor plan, Fig. 4. Small loads are easily removed from railroad cars at various locations on the siding. The truck entrance allows trucks to drive alongside an elevated platform that facilitates loading and unloading operations.

Fig. 1 shows one of the two small slitters marked A in the first bay, Fig. 4. Part of the coil stock can also be seen in this view.

Figs. 2 and 3 show the large slitter on the elevated platform at the west end of the second and third bays. This unit is located so that it is loaded by one of the cranes in the third bay and unloaded by a crane in the second bay. This distributes the job of serving the slitter so that loading and unloading can be speeded up greatly since a separate crane is utilized for each operation.

Five Coils Simultaneously: An extremely efficient arrangement of reels and twin reel stands is employed here that permits five coils to be in process simultaneously. Referring to Fig. 2, it will be seen that the slitter is a "pull" type; that is, the stock is pulled through the slitter with no power being applied to the slitter rolls once the stock has been fed through and started on the re-winding reel, at foreground in Fig. 2.

Fig. 3, taken farther back but from the same side of the slitter as Fig. 3, shows how the re-winding reel is connected to a drive motor and gear reducer through a hand-operated clutch.

While one coil is being slit, a new coil is being loaded on the other reel of the twin-reel stand on the feed side of the slitter, seen in the background of Figs. 2 and 3. At the same time, the coil that has just been slit is being moved onto one of the arms of a 3-arm revolving stand just to the right of the re-winding twin-reel stand in Fig. 3. An air cylinder operates a push plate working in a slot in the floor to push the cut coil onto one of the arms of the stand where workmen place steel band fastenings around the individual narrow coils, making them ready for shipment.

Thus, five full-width coils can be handled simultaneously — one being run, while another is being loaded and three that have been slit are being banded. This greatly speeds up the entire slitting operation, because banding is a hand op-

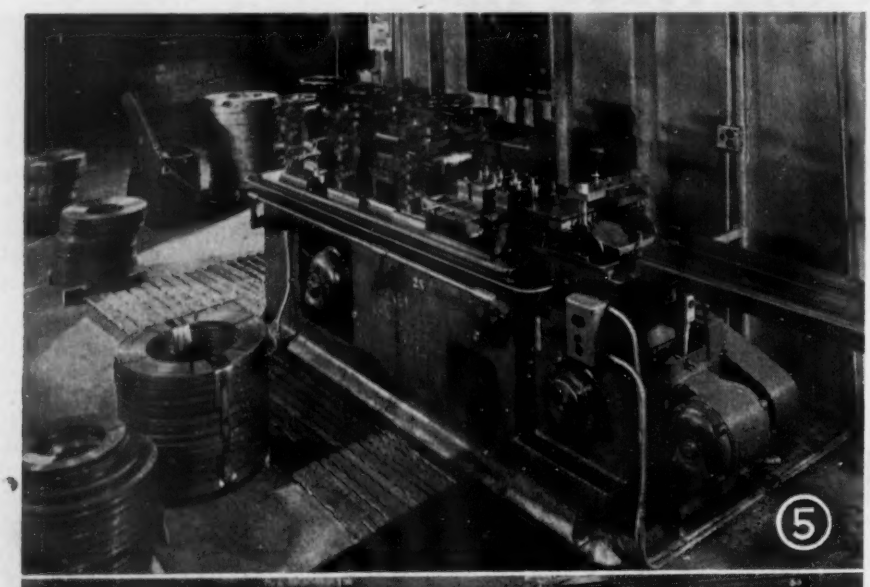
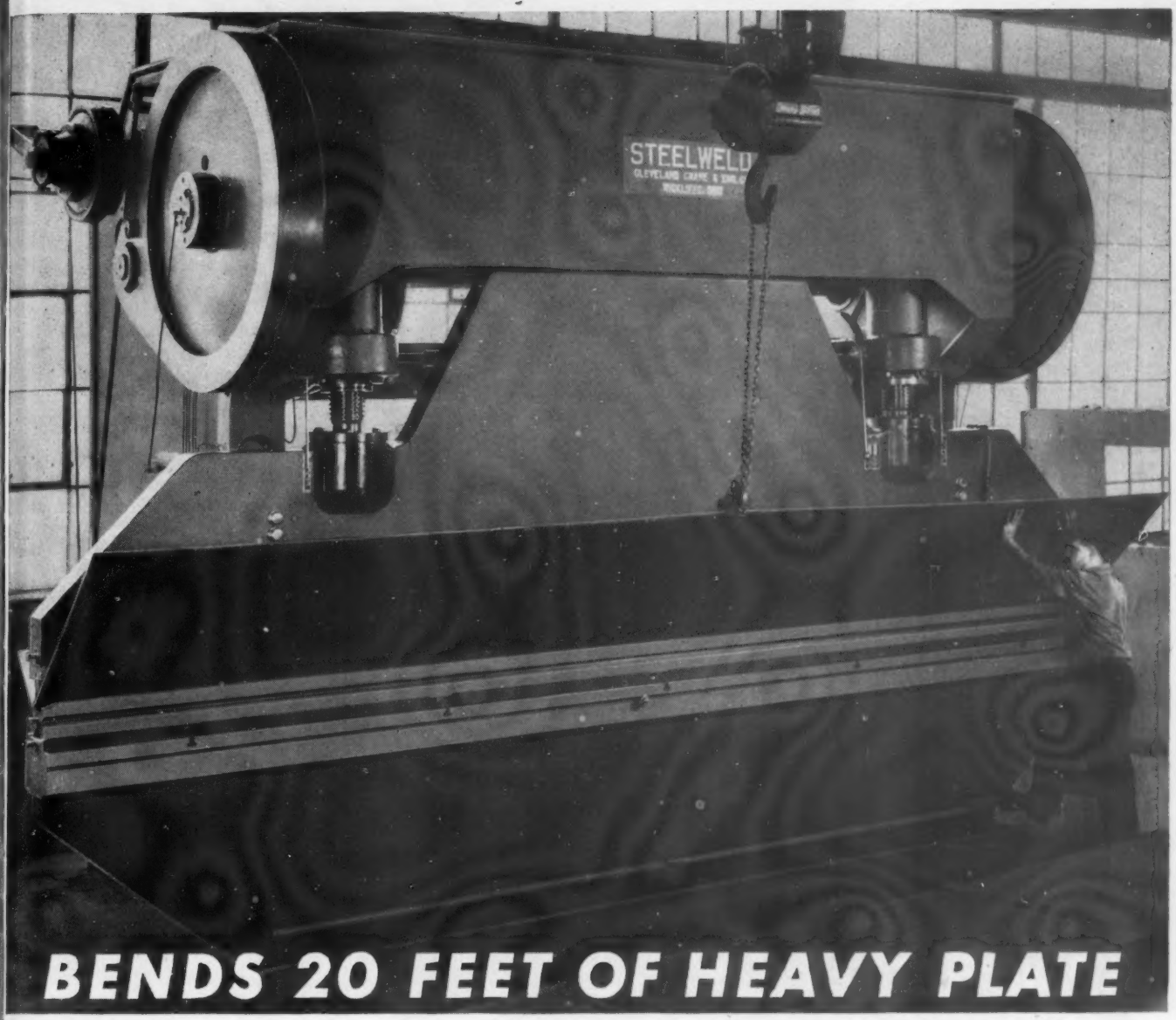


Fig. 5—Edging mill combines roller leveler and edge roller into single machine as shown here

Fig. 6—Portion of flat stock storage. Note crane with special sheet grab at center left

Fig. 7—Mounting shears on platforms 2 ft above floor level increased output one-third



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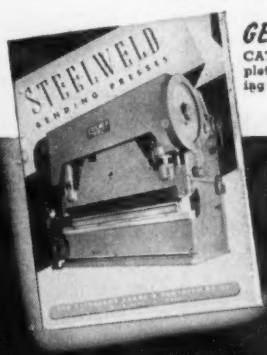
How long does it take you to weld or rivet two $\frac{5}{16}$" x 20'-0" steel plates together at right angles? How long if you were making a U-shaped or Z-shaped item?

For work of this sort you will find a Steelweld Press a most useful tool. It will cut time and cost to a small fraction. You will save even when you only have occasional odd jobs. For production runs the reduction in time is tremendous. And you will save rivets and angles or welding rod and power too.

Bending is just one of the various types of work you can do on a Steelweld Press.



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eration that requires a certain amount of time. Slitting, on the other hand, goes rather fast, 5 to 10 min being sufficient for a 3500 lb coil of 16-gage steel.

This arrangement permits the slitter to be operated at a much higher load factor (more time spent actually slitting) than would otherwise be possible. It is an excellent example of the kind of planning that has gone into the handling of materials in this plant. Here management has fully recognized that no machine can be operated faster than you can get material to and away from it.

The other large slitter is indicated by B in the near end of the second bay, Fig. 4. Between the two small slitters and the two large ones, the plant is able to handle coiled stock in thicknesses from 0.001 to 0.109-in. Strip can be cut to any length from ⅛ to 24 in. in width.

The edge roller at the far end between the fourth and fifth bays is a combined roller leveler and edge roller. It is illustrated in Fig. 5. It can be used to handle a wide range of strip. Primary purpose of this machine is to remove the burr or sharp cut edges of the strip. These edges are engaged by grooves in rollers that revolve on a vertical axis while the strip goes through the machine flat, that is, in a horizontal position. This turns and cold works the edges to produce a smoothly rounded contour as may be desired.

Fig. 6 is a general view of the sheet storage area with bar racks in background. Part way down the bay at left can be seen an overhead crane picking up a bundle of sheet, using a special sheet grab.

Shearing Innovation: A simple yet highly effective device that has made possible important handling economies here is the mounting of the shears on a platform 2 ft above the regular floor level. The platform is large enough to accommodate not only the shears, see Fig. 7, but also to provide room for the 4-wheeled dollies or hand trucks used in carrying stock to be sheared. Ample working room is provided around the shears on the feed side and ends at the elevated level.

But the discharge side of the shears is backed up to the edge of the platform so that sheared material falls down a slight incline that delivers it at convenient working level.

Anyone watching the workers on such an arrangement finds it a great contrast to the usual shearing job where the shear is mounted at floor level. Conventional floor level mounting allows the sheared steel to fall to floor level, from which position the workers must stoop over to pick it up. This continual stooping and lifting can easily be the cause of excess fatigue and expensive handling.

Excessive handling costs that often result from such an arrangement can go a long time without being spotted, because the handling expense is usually tied up so closely with processing work that it is not segregated and brought out into the open.

Shears here handle stock from 0.015 to 0.250-in. thick, cutting strips from ¼ to 36 in. in width.

Output Up 33 Per Cent: Mr. Shelton informs us that this simple mounting of the shears on a platform with discharge at convenient working height is regarded as an extremely important aid to more efficient handling. As seen in Fig. 7, operators at the discharge side of the shear are not required to do any lifting, the sheared material is simply slid over onto the dolly for movement to the shipping area.

It has been responsible for increasing the output from shearing at least one-third, reports Mr. Shelton.

Here, too, the loading side of the shears is in one bay with the unloading side in the adjacent bay, allowing crane loads to be distributed so two cranes can be used to serve any single shear when desired. This, in turn, is just another provision to distribute the handling load among the various handling aids, helping assure fast continuous movement of material throughout all portions of the plant by eliminating "waits" for crane service.

Note the means provided to facilitate

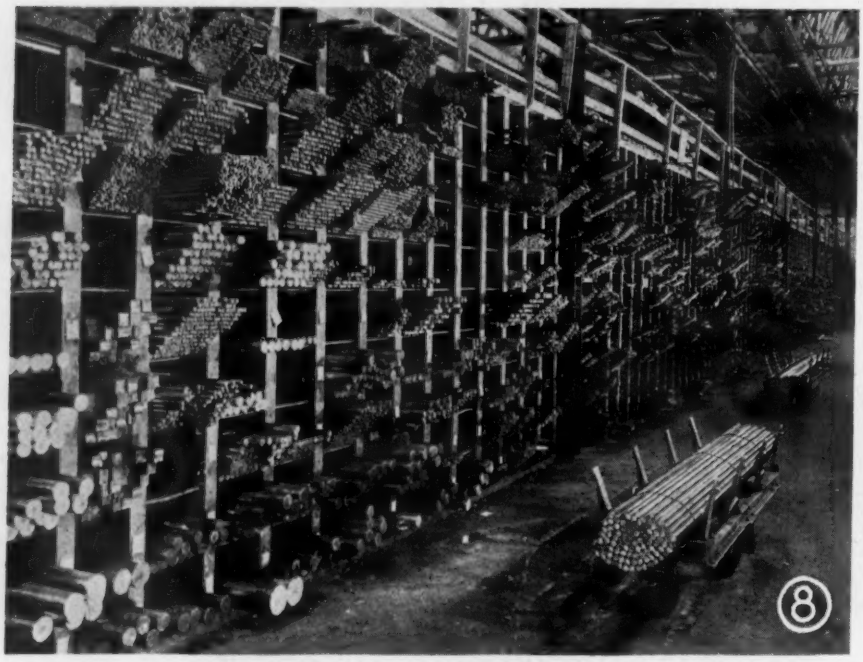

Fig. 8—Bar stock storage area. Note how upper layers overhang lower for accessibility

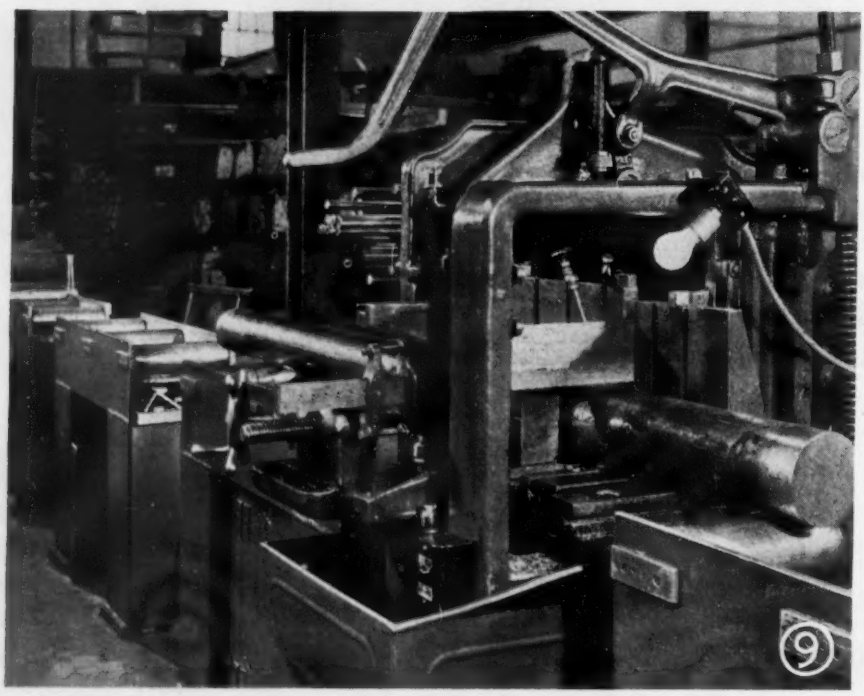

Fig. 9—One of two large power-driven cold saws in bar section near racks, Fig. 8

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strapping sheared stock in Fig. 7. The entire length of the top of the plant trucks is provided with slots that run crosswise the truck to permit spacer blocks to be positioned on edge in any convenient combination of slots. This arrangement provides ample space under the load for strapping at any number of locations along the length of the load.

Handling Bar Stock: Examination of Fig. 8 will reveal several examples of thoughtful planning for efficient handling. Note that only the bottom layer of stock in each bin is positioned flush with front of bin. Each succeeding layer is allowed to overhang the layer underneath it slightly. This makes it easy to obtain a hold on the bar when it is to be removed and thus facilitates handling.

Too, special grips and slings used with the overheated cranes help in handling operations. Fig. 8 also shows the special plant trucks used. Note that ample provision is made for space under the load to make strapping the bundles an easy job. One of two power-driven cold saws for cutting bar stock to length is seen in Fig. 9.

Preparing Shipments: Another innovation in this plant is that a special crew is reserved for preparing stock for shipment. That is the only type of work these men handle. They thereby become specialists in packaging the bundles for shipment.

All orders are delivered to the packaging department when ready for shipment. Here most shipments are packaged by supporting the steel on skids and using boards to enclose top and ends as well as the bottom. Boards at ends, top and bottom, are then tied into the load to make a secure unit by applying steel straps lengthwise in both vertical and horizontal planes and by other straps around the girth. Result is a package that fully protects the steel, assuring safe arrival at its destination.

Atmosphere Control: Since raw steel in any warehouse is easily damaged by rust caused by moisture condensing on the steel, provision is made for heating the entire warehouse so that the steel is kept at a temperature where condensation will not occur. Spring steel stock, because of its sensitivity to corrosion and high value per pound, is kept in a separate room where special provisions for its care are installed.

Inherent Dangers in Punch Press Operations Greatly Reduced by

Applied Safety Principles

An analysis of the elements which cause serious accidents on these widely used tools and a "specific" in the form of a properly designed flattening die

By ALFRED R. STAHL
Chief Engineer
Otto Konigslow Mfg. Co.
Cleveland

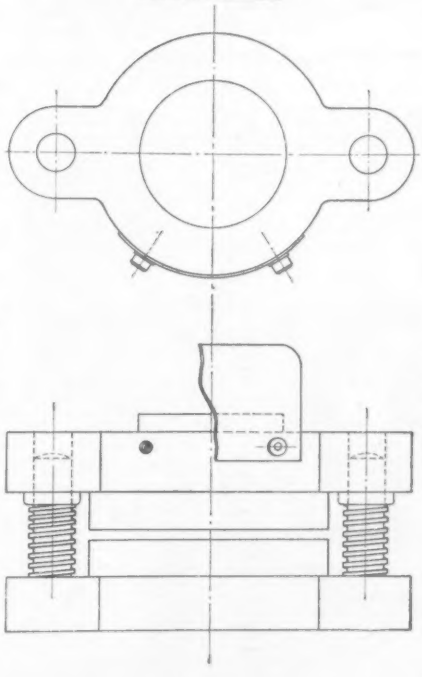
SAFETY in press departments is, to a large extent, up to management. Safety rules and regulations mean little if the equipment is hazardous. Every conscientious executive has to make it his first rule to make equipment as safe as possible. How much this can accomplish is a matter of economics and practicability.

Very much effort and ingenuity have been spent in safety equipment on punch presses. However, the primary part which causes accidents on punch presses is the die or tool itself. The die and tool design has been done in a quite conservative way, and very little has been developed to make dies themselves safe. It seems that this is really the object to look after in prevention of accidents.

A die which is most dangerous and, so far in the writer's experience, one which has caused many accidents, is the flattening die. The element of risk inherent in this type of die is that parts have to be fed in by hand and taken out the same way, while the operation itself is very fast.

One solution to making this widely-used operation safer is given in the accompanying drawing which shows a

FLATTENING - DIE



safety flattening die. It is practically impossible for workmen to be injured on this die. This has been accomplished by a different arrangement. Instead of fastening the flattening punch to the punch press ram, as is usually done, the ram of the punch press is used as a hammer only. The flattening die is a self-contained unit with just enough space between the upper and lower part to enable the part to be put freely in between, but not having enough space to permit a finger to enter this flattening area.

One conventional way of building such a die is as follows:

A standard die set in a size suitable for the maximum parts to be flattened is provided with two hardened plates—one for the upper, and one for the lower die set part. The upper die set part, also called punch-holder, has, instead of a shank, a straight hard plate which is hit by the punch-press ram. The necessary working space or clearance between punch and die is provided by two pressure springs which hold punch and die in whatever clearance is necessary. A loose fit is recommended between bushings and guide posts to be sure that after the ram descends, the punch part of the die is in the upper position to enable the flattened part to be either pushed or blown out.

As a further safeguard, a shield is provided on the punch holder high enough to cover the stroke of the ram. Using a hardened punch of any shape with a flat bottom on the punch press ram is recommended to eliminate any wear on the press ram.

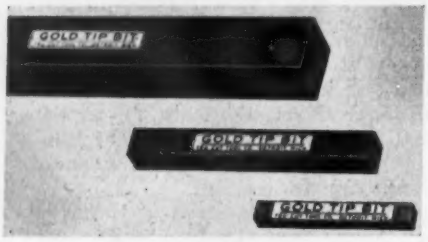
As a universal die for flattening parts of different shape, a round flattening die is most suitable and production can be speeded by setting the die on an angle rather than working from the front to the back.

The die design described also is adaptable for many other punch press operations, especially where parts have to be punched or pierced within a certain height not larger than finger thickness. One way of making other punching dies or piercing dies safe would be to follow the same system as described on the flattening die and make a self-contained unit out of a die which only has to be hit by a punch press ram to perform whatever operation is necessary.

INDUSTRIAL EQUIPMENT

Tool Bits

Designed for heavy cutting on scaley materials such as forgings and castings, as well as for hogging and rough cuts, a complete line of Gold-Tip precision ground tool bits is announced by Tru-Cut Tool Co., Detroit. These tool bits with



a rockwell of 62/64 will not chip or break.

Included in the standard line of tool bits are squares ranging from 3/16 x 3/16 x 2½ to 1¼ x 1¼ x 7; flats range from ½ x ⅝ x 5 to 1¼ x 1½ x 8; cut-off blades range from 3/32 x ½ x 4½ to 3/8 x 1 x 6. No special grinding is required, each is ready for use.

Hydraulic Feed Machine

Two 4-spindle drilling units, two 4-spindle reaming units and two single-spindle precision boring units are features on the new hydraulic feed machine introduced by Moline Tool Co., Moline, Ill. Each unit has its own hydraulic feed cylinder and feed rate regulating valve.

It has complete automatic electric control so that skilled operators are unnecessary as the operator's duty is to load and unload the work from the fixture and press the button to start the automatic operating cycle. During cycle work is indexed automatically by hydraulic power to bring each group of holes into proper relationship with tools as required. It was designed for drilling and reaming twenty-four ⅞-in. holes and finish boring twenty-four 1¼-in. holes in an aircraft aluminum gun mount inner ring.

Abrasive Materials Tester

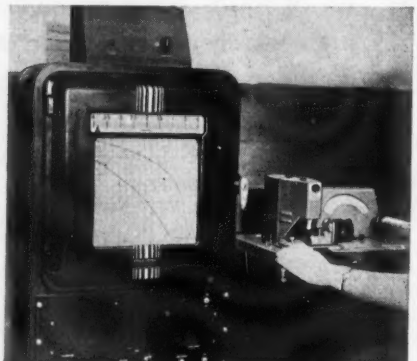
Abrasive hardness and bond structure testing is possible with the new comparator (Podesta Patent), offered by Hanchett Mfg. Co., Big Rapids, Mich. When the comparator is in operation, a

diamond or a special alloy steel grading tool oscillates under a given load and gradually penetrates the grinding wheel or the material to be graded. Number of oscillations is predetermined for each material, based on comparative tests made on material previously proven satisfactory. Upon completion of the specified number of oscillations, grading tool records the depth of penetration within 0.001 in. on an indicator. Grinding wheels of the exact same hardness and bond structure can thus be classified and segregated.

The unit has a rigid, vibration-proof base, a rectangular table 15 x 22 in., and a maximum work height of 6 in. Table is vertically adjustable for proper setting of work, a lever handle raises and lowers the tool. This permits repositioning of work without changing setting of table. Timer, set for required number of oscillations, automatically shuts off on completion of cycle. Spindle is constructed to withstand heavy thrusts and is mounted in precision anti-friction bearings.

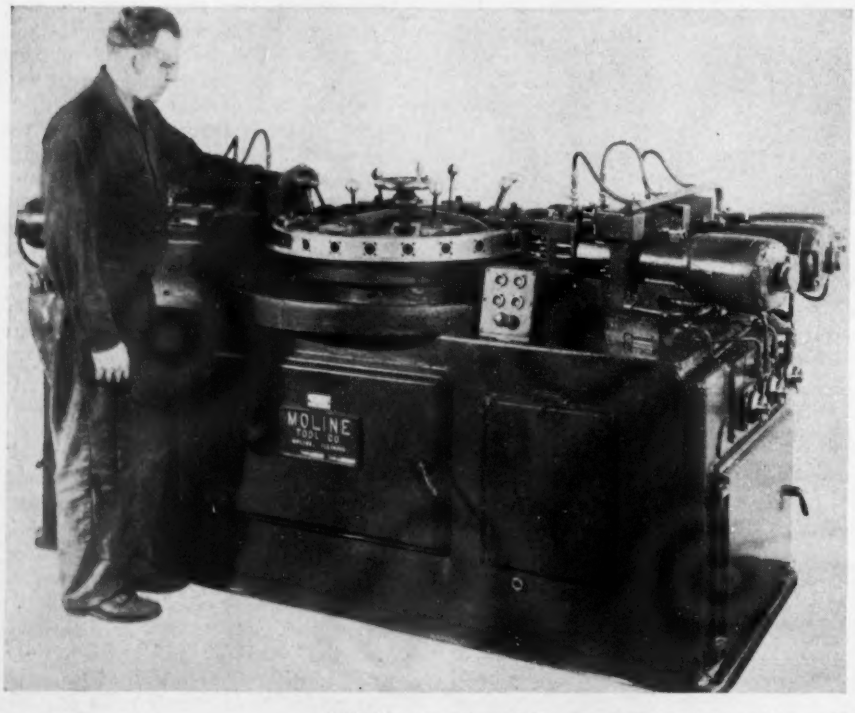
Recording Densitometer

A new recording densitometer is offered by Triplett & Barton Inc., Burbank, Calif. The electrically operated apparatus automatically computes a true, logarithmic graph of its findings, completing in 30 sec a permanent curve. Particularly valuable for



detecting variations in photographic or radiographic film, the principle of operation can be utilized in any field where variations in the subject can be detected by electronics.

The instrument was designed and built by the Electrical Research Division of Western Electric Co. and Leeds & Northrup Co. to meet specification requirements developed by Triplett & Barton Inc.



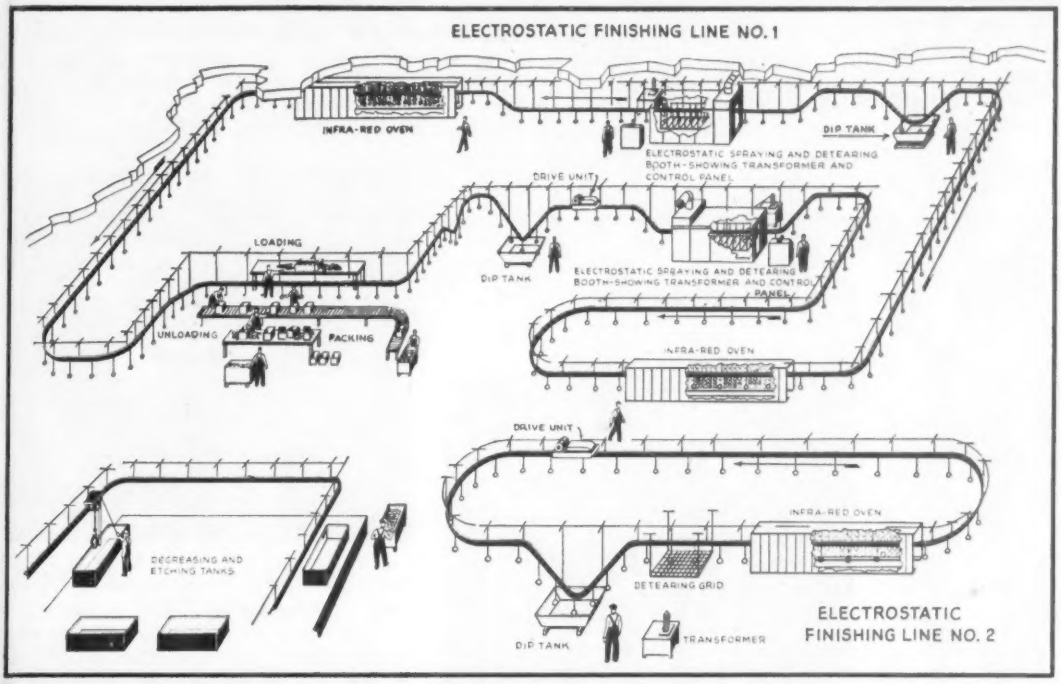
Countersinks

Grobet File Co. of America, 421 Canal street, New York 13, announces new two-fluted countersinks. These patent applied for countersinks are recommended for cutting aluminum, magnesium, steel, plastics, plywood, etc. They give a smooth microfinish and also are adaptable for coarser work such as brake linings. Made of high speed steel and ground after hardening,

(All claims are those of the manufacturer of the equipment being described)

THE FINISHING TOUCH

SECOND SERIES—NUMBER ONE



At left is a drawing of the Japan Company's electrostatic finishing department. Line No. 1, 525 feet long, can turn out 100,000 finished parts, dipped or sprayed, in a single eight-hour shift.

Other Japan Company departments do etching, phosphate coating, steel pickling, decorative finishing of all kinds, roller coating, silk screen printing and designing, assembly, shipping and export packaging.

JAPAN COMPANY EXPANDS TO HANDLE FINISHING WITHIN 500-MILE RADIUS

The Japan Company, Cleveland industrial finishing firm, has installed additional electrostatic finishing and infra-red baking equipment which steps up production capacity approximately 50 percent. This expansion has been made to handle an increasing volume of enameling, lacquering and other paint finishing business which is coming from New York, Philadelphia, Detroit, Chicago and many other cities within a 500-mile radius of Cleveland.

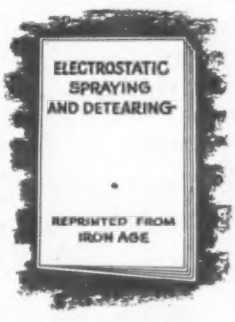
This influx of work from distant points is a new development in the finishing industry. It was previously thought economically impractical to send parts from one city to another for finishing.

However, by combining electrostatic finishing processes with extreme efficiency in handling and baking, the Japan Company is now able to compete successfully with local finishing plants *and with your own finishing department.*

Electrostatic finishing produces a superior paint film at extremely high speed and low cost. In addition, the Japan Company has assembling and shipping facilities which make it possible to deliver finished products in the same (or less) time than a finisher in your own vicinity.

Space does not permit a full description of electrostatic finishing on this page, but the second advertisement of this series will describe electrostatic spraying and the third, electrostatic detearing.

Should you want more information immediately, just write for a free copy of our *Iron Age* reprint, "Electrostatic Spraying and Detearing", and let us know whether you would like to have a Japan Company representative call at your plant.



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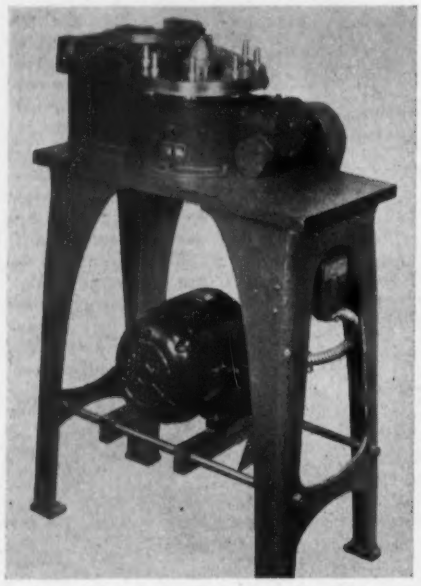
they are ground to close tolerances.

There are eight twin-fluted countersinks to the set, giving a full range of six sizes with duplicates in two sizes.

Marking Machine

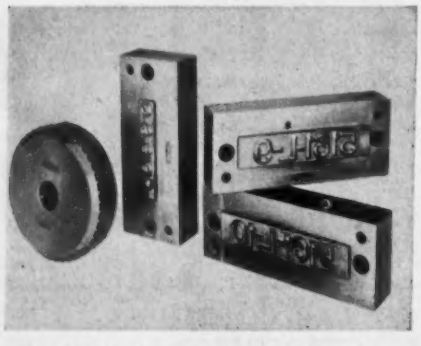
A rotary marking machine for marking steel spark plugs is offered by Wm. A. Force & Co. Inc., 216 Nichols avenue, Brooklyn 8, N. Y. Adaptation of a mandrel table on which parts to be marked are placed is included in the unit. Therefore, in marking piece moves past the stationary marking dies revolving on its own axis. A special mandrel support to prevent deflection is provided. Each



of the eight individual mandrels are separately adjustable for position by use of eccentric bushings. The illustration shows machine tooled for marking steel spark plug bodies at an approximate rate of 1500 per hour using one operator for both loading and unloading. Similar units have been made for marking on thin walled condenser cans and other similar products.

Stamping, Rolling Dies

Made from selected alloy tool steel and machined to utilize center of steel, the new Acro-bevel stamping dies and



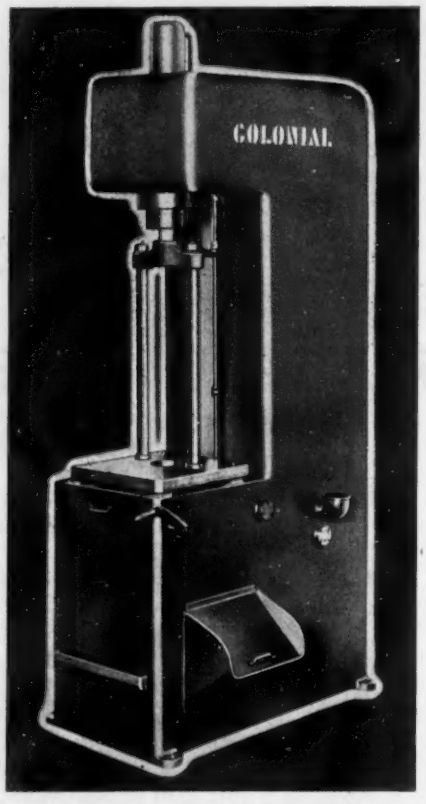
tool dies are engraved with the direction of grain or flow of the steel to increase their strength. These stamping dies are manufactured by the Acromark Co., 398 Morrell street, Elizabeth 4, N. J.

The roll die shown is for use in graduating of scale bars used in operating mechanism of a precision machine. By gearing with the slide carrying scale bar as it is marked, graduation markings are directed to precision position required. The die is engraved so as to withstand gearing control and to withstand excessive service with no apparent wear.

The stamping dies shown are used in a press, standard power driven or hydraulic, for full depth sinking of markings. In the case of a closed character or an unsupported part of an open character, for example, the Acro-bevel technique is to increase the strength at that point to match the strain, thereby precluding premature breakage or wear.

Attachment For Press

Broaching presses are now available from Colonial Broach Co., Box 37, Harper Station, Detroit 13, with a pull-



down attachment, making them suitable for pull-broaching as well as push-broaching. Increased flexibility thus provided in hydraulic presses is particularly useful where extreme broaching accuracy is required or where broaches are too small in diameter to be pushed through the work.

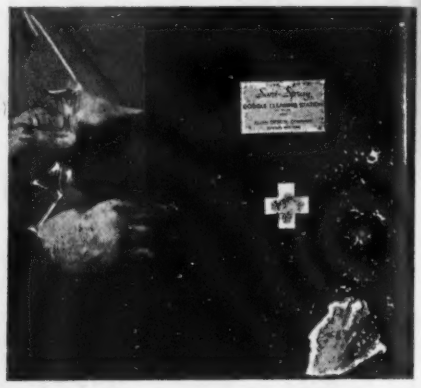
Attachment has two vertical guide rods tied together top and bottom with tie-bars. Lower tie-bar of the attachment carries a puller adapter designed to permit use of automatic pullers. Accurate alignment is assured through use of hardened and ground bars for guiding broach, guides sliding in long bushings pressed into the platen bed.

The device is available on the full line of the company's presses, ranging from 4 to 10 tons rated capacity. Strokes of presses range from 24 in. on the 4 ton to 36 in. on the 10 ton model with strokes adjustable to lesser amounts by stops.

Goggle Station

Sani-Spray goggle station and Sani-Spray goggle cleaner for industrial use are announced by Allen Optical Co., Buffalo 2, N. Y.

This goggle station is a self-contained, heavy duty, steel atomizer cabinet, designed specially for applying Sani-Spray goggle cleaner. The cabinet holds a refillable quart jar of the liquid, a supply of

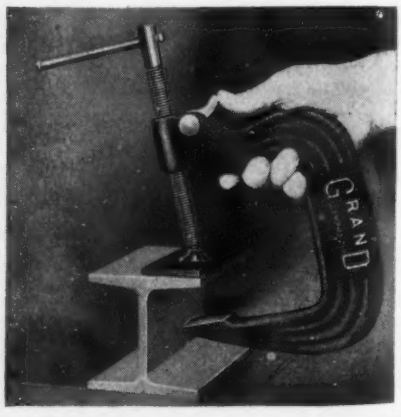


tissue paper, and a built-in receptacle for used cleaning tissues.

Push-button control releases a fine mist of the cleaner from an orifice on one side of the cabinet. Pressure for the fluid is provided by connecting to the plant air line. An adjustable control valve regulates the predetermined amount of spray that is applied to the goggles. All contents of the cabinet are tamper-proof under lock and key.

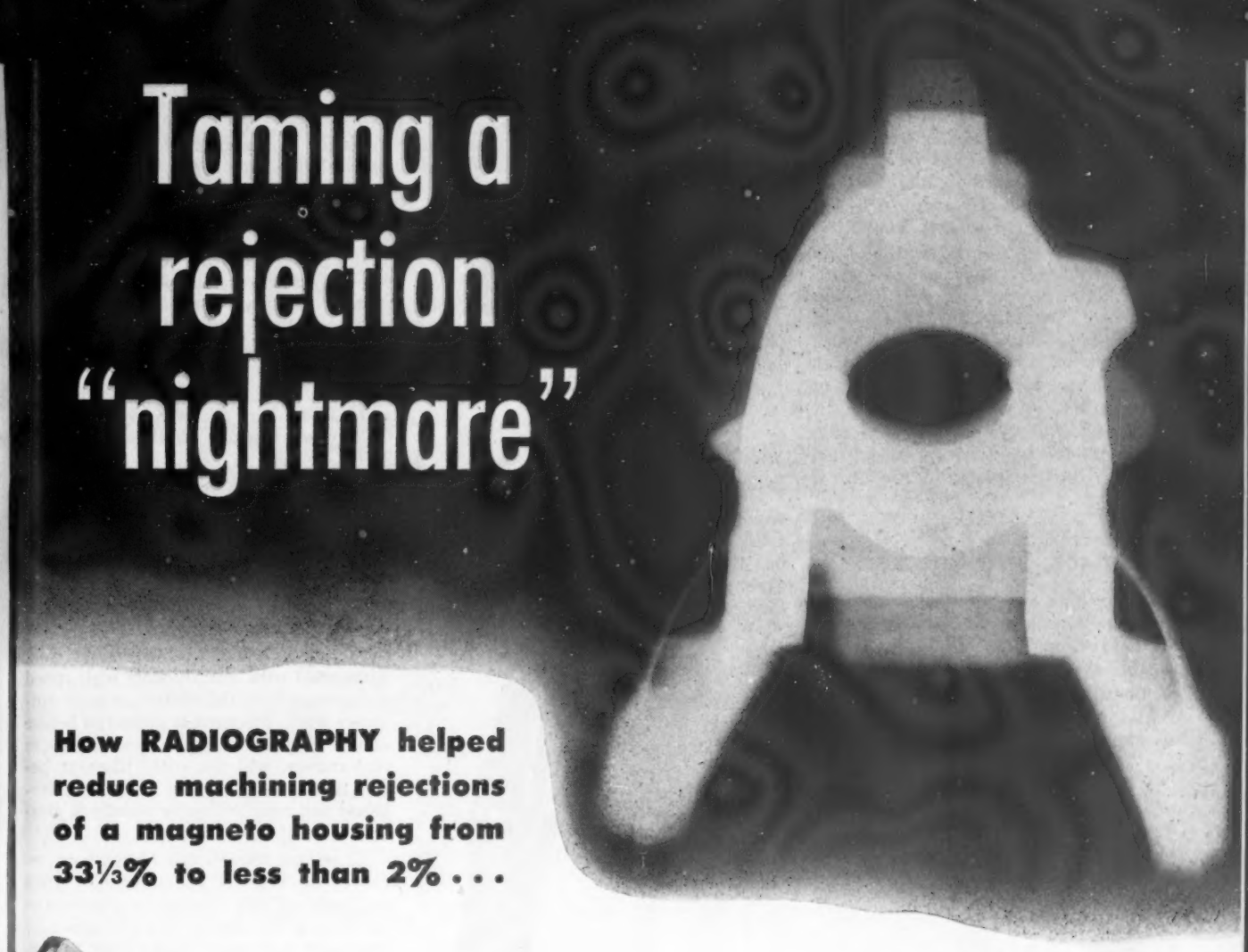
Deep Throat Clamps

A new line of extra deep throat speed clamps is offered by Grand Specialties Co., Grand avenue at Troy, Chicago, 22. In addition to the extra deep throats, this



type, known as the Grand ASL extra deep throat speed clamp, incorporates quick action features. Clamp can be positioned instantly by pushing down on ratchet screw and tightening with a turn of the loose-proof handle. Clamp releases

Taming a rejection "nightmare"



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DESIGNED with features that simplified production—promised better service—this magneto housing was still no cinch to produce . . . was intricate . . . contained several inserts . . . required considerable machining . . .

Prints for the housing were released to the foundry . . . a casting technic was developed . . . castings delivered. Radiographic inspection—standard procedure with the customer—revealed irregularities in the flange. Rejections amounted to 33⅓%.

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Rejected castings—and the radiographs—were sent back to the foundryman for his own analysis. Better casting technics developed, better castings were delivered. But radiographic inspection didn't stop there. Each day, rejects—and radiographs of them—were returned to the foundry. After 3 weeks this co-operation of foundry and customer resulted in a casting technic that "hit the nail on the head." *Rejections slid from 1/3 of production . . . to less than 2%!*

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Kodak

instantly by merely loosening handle and pushing on trigger release pawl which frees the ratchet screw so that clamp is ready immediately for application to work of any other size or thickness.

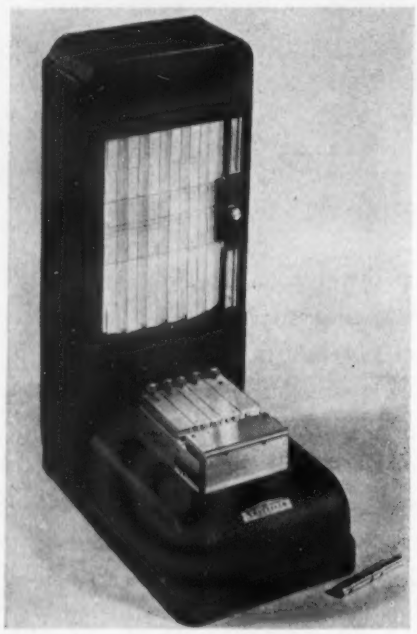
Additional features are that the clamp is protected against damage from welding spatter by a copper plate on all working parts as well as on the loose-proof handles, that it is rust-proofed with baked enamel finish and it will hold work firmly on any surface, even slanting or irregular.

This line of clamps includes three sizes the largest size being the 8¾ in. opening with 6 in. throat. Capacity of each size is 3,500 lb.

Tolerance, Size Checker

A new high amplification 5-tube Precisionaire has been developed by the Sheffield Corp., Dayton, O., which is capable of determining tolerances of plus or minus five-millionths of an inch.

Five tubes, each capable of providing an amplification of 18,000 to 20,000 to 1,



are combined in one instrument to check 10 points along the ½-in. diameter of a highly critical part. Out-of-roundness, taper and size conditions are disclosed.

The part is checked as shown by placing it against the left side rail and rotating it through 180°, this operation simultaneously checking five points along the diameter. It is then placed against the right side rail and again rotated through 180°, a simultaneous check of five different points being again obtained along the diameter. Tungsten carbide locating pads at bottom and both sides of gaging slot serve to properly locate masters and work part.

Minimum and maximum fixed size masters are used to set up the unit. Center line of the transparent slide is used as reference for this setting. With maximum size master in gaging position, orifices and air pressure in each tube are so regulated that all five floats are at the same horizontal line. The same method is employed in the minimum master.

Maximum and minimum tolerance limits are indicated by lines on the transparent adjustable sight. This sight in conjunction with the calibrated scale, enables the operator to inspect the parts for desired classification.

Electrode Holder

Designed to prevent slipping in the welder's mitt or glove when changing rods, an all plastic, four-cornered collar has been incorporated in the 300 amp Stubby model electrode holder manufactured by Martin Wells, 5886 Comp-

ton avenue, Los Angeles. It makes rod changing easier as it provides a positive convenient grip on the insulator; it holds small rods upright and away from contact with work. Collar remains cooler than cap.

Portable Test Sets

Two portable ac test sets, capable of supplying test voltages from 0 to maximum rated voltages (2000 and 6000 v) are announced by General Electric Co., Schenectady, N. Y. Either set can operate from any 115 v, 50 or 60 cycle outlet and have a capacity of 2000 va. These units were developed for testing diesel-electric locomotives larger than 600 hp, but have other industrial testing applications such as generators, motors, motor parts and appliances.

Both sets consist of a dry type step-up transformer, variable-voltage autotransformer, two indicating voltmeters, voltmeter selector switch, signal lamp, air circuit breaker with magnetic overload trip and a supply switch. Two 15 ft shielded test leads with insulated handles and a 15 ft supply cord with plug are also included. One indicating voltmeter is used to measure voltages up to half of the maximum rating and the other up to full test voltage.

Sets are housed in rectangular steel cases mounted on three wheel trucks and grounded through the third conductor in the supply lead. When sets are not in use, three leads are coiled and hung on hooks attached to rear panel of case. Both sets are 19 in. high. The 2000 v unit is 18 in. wide, 22 in. long and weighs 290 lb; the 6000 v set weighs 325 lb and is 15 x 25 in.

Ionization Gage

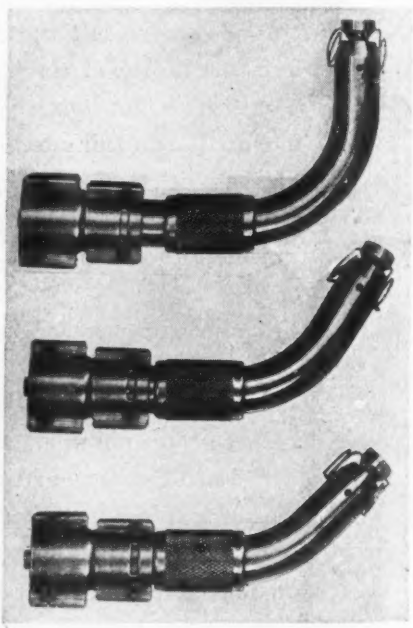
Precision Scientific Co., 1750 North Springfield avenue, Chicago 47, announces the Precision-Televac, Type E-31, ultra-vacuum gage.

Electrical leakage is eliminated and, when used with a moderately high speed pumping system, this ionization gage outgasses itself. Filament is protected before and during operation automatically, in that current will not enter filament before pressure of 1 micron has been established and turns off automatically if pressure rises above 1 micron.

Gages are interchangeable without recalibration and are guaranteed for 1000 hr. Standard E-31 ionization gage comes on scale at 0.4 micron (4×10^{-4} mm Hg). It is used with the Televac type "S" recorder.

Round Riveter

An improved round riveter is announced by Topflight Tool Co., Towson, Md. It is made in four standard models



and can also be obtained in sizes to suit a particular job. Curved shaft of the adapter is one of the features of this device.

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the way back...

Just as they have helped assure victory in war, American business papers are now helping lead the way back to greater achievements in peace.

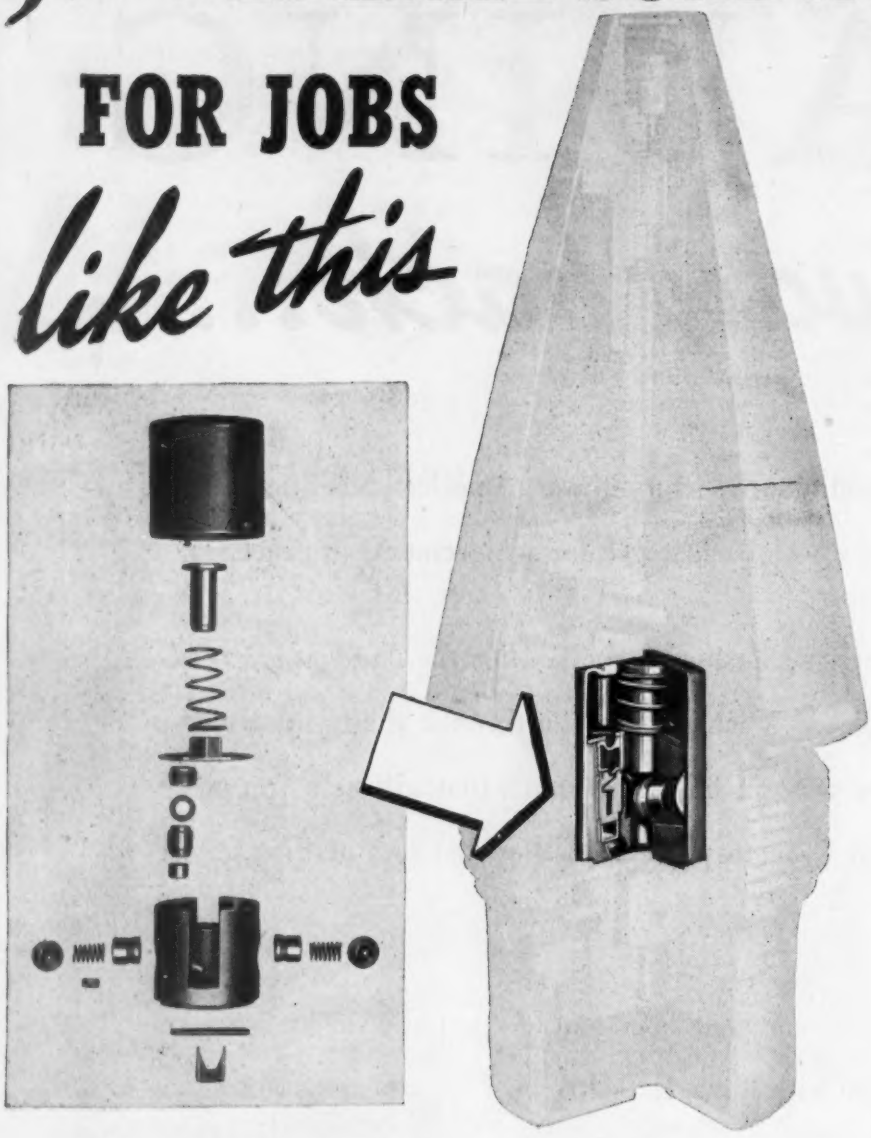
From the pages of American business papers—*like the one you are reading now*—you have learned much to help you through the trying days of war. From these pages you can now learn much that will help you make the transition from war back to peace with the least loss of time, effort and profit.

Your business paper editor is your experienced counsel. He knows your problems. Discuss them with him. It is his business to help you solve them. Read your business paper regularly and carefully because the business paper reader is a better business man.

One of a series of messages prepared by the Business and Industry Department of St. Joseph's of Indiana, college for men, at Collegeville, Indiana.

It's FEDERAL SCREW

FOR JOBS like this



FEDERAL SCREW WORKS is prepared to supply *complete assemblies* of screw machine products and cold forged parts, taking over the entire production burden and delivering the units you need . . . when you need them . . . ready for installation or use.

The shell fuze illustrated is typical of the work we do. The complicated Plunger Body shown in the exploded view is just one of several subassemblies required—units made up of high-precision parts and requiring the most expert care to put together. Except for springs and stampings, we've made all parts for the entire fuze, and have turned out *millions* of these fuzes . . . completely assembled . . . to closest Government specifications.

We would welcome the opportunity to do similar work for you. For quotation on prices and delivery, tell us your requirements.

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CHELSEA DIVISION

Federal SCREW WORKS

DETROIT AND CHELSEA, MICHIGAN
MAIN OFFICES: 3401 Martin Ave., Detroit 10, Michigan

Roller Bearing Steels

(*Continued from Page* 102)

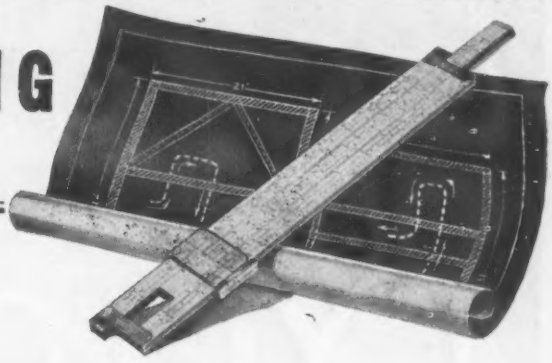
uation in the roller bearing industry has progressed through problems similar to those encountered in the ball bearing industry. When roller bearings were first manufactured, it was believed that the contact between rolls and races should be uniform throughout the length of the rolls, and if the rolls become skewed in operation, a soft core would absorb a greater bending stress. Therefore, case hardened steel was adopted immediately for use in these parts because it supplied flexibility at the surface with toughness in the center. However, the alloys used have depended upon the load conditions and the section thickness in order to maintain the proper case depth with core hardness for each part.

Research Improves Quality

The steel used in roller bearings has improved with the research work done by the bearing manufacturers and steel mill metallurgists. At first, any good carburizing steel was considered satisfactory. One of the outcomes of this research work was the McQuaid-Ehn test, developed by metallurgists in the Timken organization and followed by the grain size standardization program. Before the advent of the McQuaid-Ehn test, it was thought necessary to use alloy steel in order to obtain uniformity of carburizing and hardening results. Chromium steels and chromium nickel steels thus became standards for roller bearings. With the development of nickel-molybdenum steels, fatigue tests were run to determine life, wear resistance, and load capacity of roller bearings. These indicated that alloy steels were necessary to obtain the properties desired in good roller bearings. SAE 4615 steel became the standard for automotive type roller bearings. Heavy duty bearings required higher percentages of alloy and deeper penetration of case in order to support the unit loads. Some ball bearing manufacturers making roller bearings preferred to use only one type of steel and heat treating equipment and, therefore, use 52100 chromium steel for both.

At the beginning of World War II, there was a shortage of alloys, especially nickel. As a conservation measure, WPB organized the roller bearing metallurgists and steel mill metallurgists into a Roller Bearing Section of the Technical Advisory Committee on Carbon and Alloy steel bars. Their first action was the adoption of a carburizing alloy steel containing 1.05 nickel and 0.50 chromium and 0.25 molybdenum and sold as RBEC 4620 for automotive and truck bearings, but no changes were made in railroad and large bearings analysis. As the war progressed, some hardenability difficulties developed on heavier sections of races. Later meetings indicated high alloy contents were necessary on small bearings, so WPB finally permitted the use in roller bear-

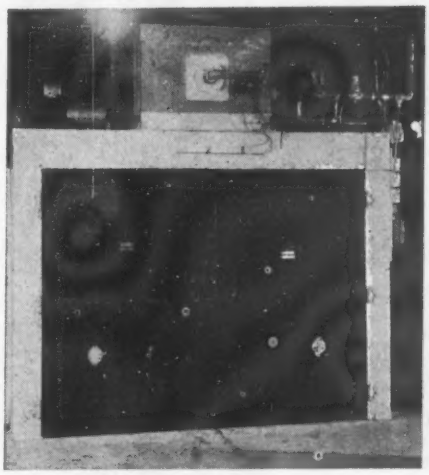
OVEN ENGINEERING NEWS



Standard Box Ovens Provide High Speed, Top Efficiency For Simpler Heating Jobs

For simpler heating applications which do not require elaborate handling, conveying or heating equipment, box-type ovens such as those shown here can often be used to advantage. The Industrial Oven Engineering Company designs and manufactures a complete line of such ovens, in addition to its specially engineered oven-conveyer and oven-processing systems.

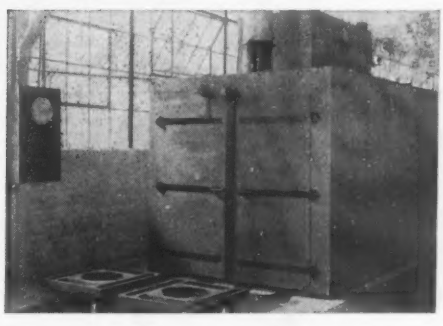
Each box oven is, of course, custom built, assuring maximum efficiency for each user's needs, but standardized designs mean higher construction speed.



Above: Batch-type, two-truck oven for baking armatures and stator coils. This oven's total load is 6000 pounds, carried on two trucks weighing 1000 pounds each. With this load on the basis of a short cycle bake, fuel costs average only 28 cents per hour.

This 900° oven for heat treating aluminum forgings has a built-in, high-pressure air heater for positive and rapid circulation through a relatively dense work load, and is shipped assembled.

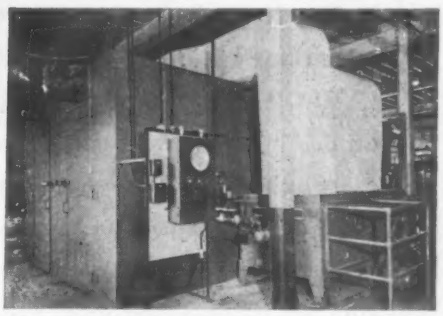
Below: A standard type of dehydrogenizing oven, made for various widths and gages of cold rolled steel strip in coils. This unit replaced less efficient equipment which handled a given load in 18 hours at 900°, and reduced the dehydrogenizing time to 9 hours at the same temperature.



Baking Time Cut; Finish Improved

The oven shown in this column, designed for baking synthetic finishes on steel storage cabinets, is now used for finishing ordnance items. Tests conducted on regular production runs show a 15 percent reduction in baking time, with a decided increase in surface luster.

Like every other **IOE** installation, this oven is equipped with a large volume convection air heater and complete temperature, safety and ignition controls.

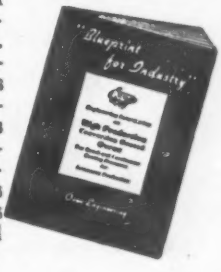


SIX IMPORTANT POINTS

1. Standard sizes and designs.
2. Wide temperature ranges.
3. Extra-capacity heating equipment.
4. Heavy, rugged construction.
5. Extreme temperature accuracy.
6. Fool-proof control equipment.

Supply Limited!

Get your copy of "Blueprint for Industry — Part II". This interesting 18-page book contains detailed information and blueprints on a variety of high-production convection heated ovens for industry, as well as other useful engineering data.



(This is No. 5 of a series. Reprints of previous advertisements will be sent free upon request)

IOE ENGINEERING VERSATILITY

THE INDUSTRIAL *Oven Engineering* COMPANY

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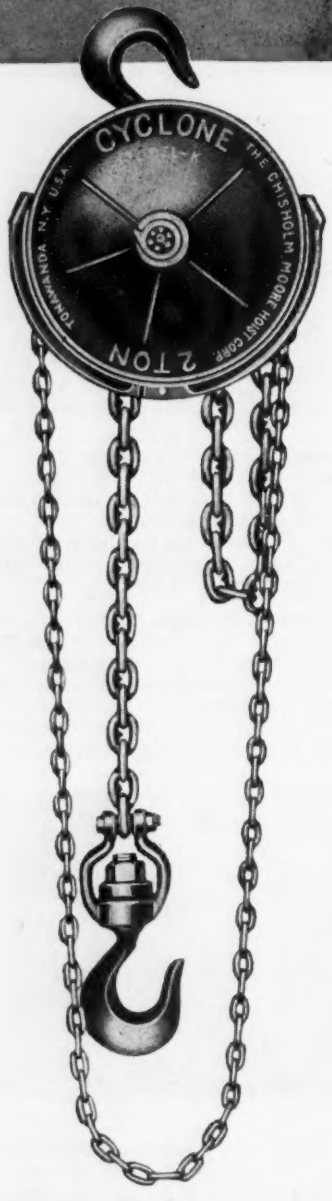
Engineering Representatives in Principal Industrial Areas

★ ASSOCIATED COMPANY: JAMES DAY MACHINERY LTD., LONDON, W. 1, ENGLAND ★

CM CYCLONE

Here's a hand operated hoist with 12 BEARINGS!



Faster action, higher operating efficiency, lasting endurance, easier handling—that's what you get in the aptly named High Speed CYCLONE Hoist. You can depend on this "tops in performance," because only in the CM Cyclone will you find **12** anti-friction bearings —a ball or roller bearing at *every* rotating point. Other extra value features are: Extra safety from the smooth gyrating yoke action... internal guides to prevent load chain slippage...accurate meshing of machine cut gears...shielded lift wheel...CM "Inswell" electric weld load chain. For a hand operated chain hoist here, definitely, is outstanding value.

Capacities from ¼ ton up.
CM Bulletin No. 100 contains complete details. Write for it.

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ings of the steels listed in Table II.

Over the years, many different steels have been tried for ball and roller bearings, but with the vast amount of experience and the results of bearings in service, the majority of production bearings for regular applications are still made of the old standbys, namely, carbon chromium for ball bearings and nickel-chromium-molybdenum for roller bearings.

The bearing industry has advanced in the purchase of raw material in much the same manner as the aviation industry with their aeronautical materials specifications. One group of analyses and standardized methods of testing have been incorporated in ASTM specification ES5a. These data are used by each bearing company and its steel sources. All indications point to the continued use of these analyses and methods of testing after war.

REFERENCES

[1]Prof. Stribeck, "Ball Bearings for Various Loads." Reports from the Central Laboratory for Scientific Technical Investigation, Neubabelsberg near Berlin, Germany, 1900.

[2]Henry Hess, "Ball Bearings". Presented at the Indianapolis, Ind., meeting (May, 1907) of the American Society of Mechanical Engineers and forming a part of Volume 29 of the Transactions.

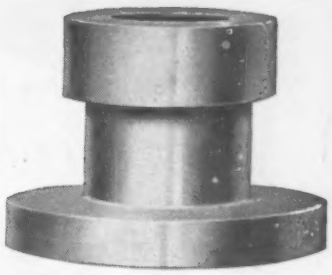
[3]American Society for Testing Materials, Philadelphia, Pa. Emergency Specification 5a "Carbon-Chromium, Ball and Roller Bearing Steels" issued Sept. 16, 1942.

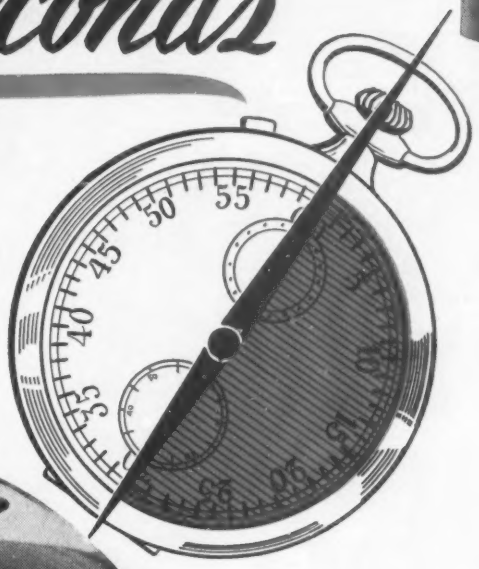
New Electric Micrometer Measures Ten-Millionth Inch

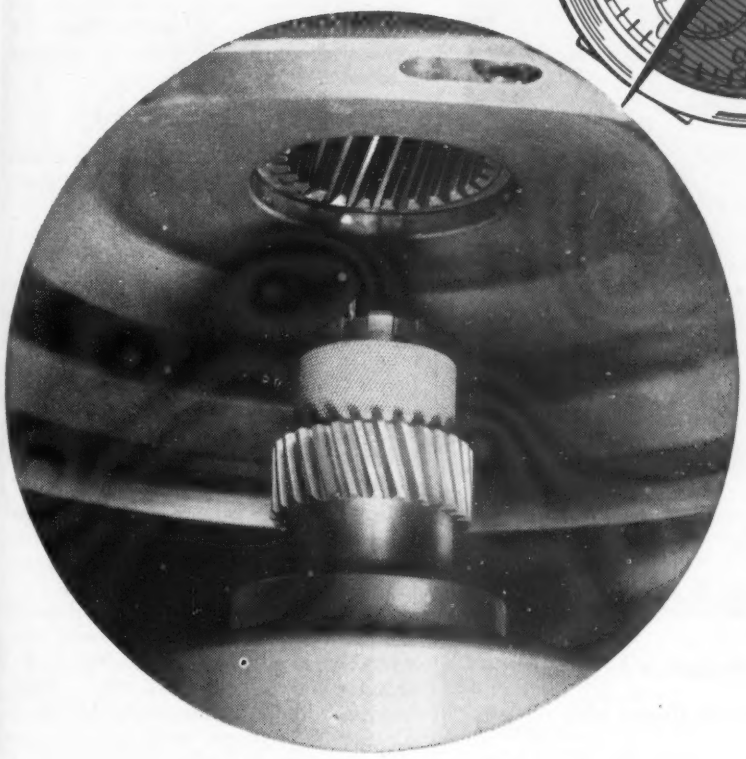
Development of a new type of electric micrometer capable of measuring motions of the order of one ten millionth of an inch has been revealed by G. M. Foley, research engineer of the physics department of Battelle Memorial Institute, Columbus, O. This instrument was developed in answer to the need for a new test for the performance of precision lathe spindles, whose accuracy previously had been measured solely by the accuracy of the parts made on the machine using the spindle. The micrometer was used to magnify by 10,000 times the inaccuracies of the spindle and produced on an oscillograph a visible pattern of effects of changes in operating conditions of spindle while running.

Mr. Foley described the micrometer as a miniature radio station whose frequency is varied by the changes in position of the spindle being measured. The output of this transmitter is received by a device almost identical with the frequency modulation type of radio receiver and is made visible on a cathode-ray oscilloscope. The instrument was equally capable of making static measurements on the roundness of the spindle shaft and of the bearings of the spindle, showing the steps which should be taken to produce more precise spindles. It has also been used to make a high-speed dilatometer to follow the crystalline changes in steels during rapid heating, and may be suitable for a number of other measuring applications.

In 30 seconds







on the SHEAR SPEED

Cutting all teeth simultaneously, the Michigan Shear Speed will produce semi-finished helical gears, spur gears or splines as fast as you can finish them on a Michigan shaving machine. The gear shown, a 2¼ inch diameter, 27 tooth helical is currently being cut in 30 seconds each.

For information on the Shear Speed Machine and Process, ask for Bulletin 1843-44

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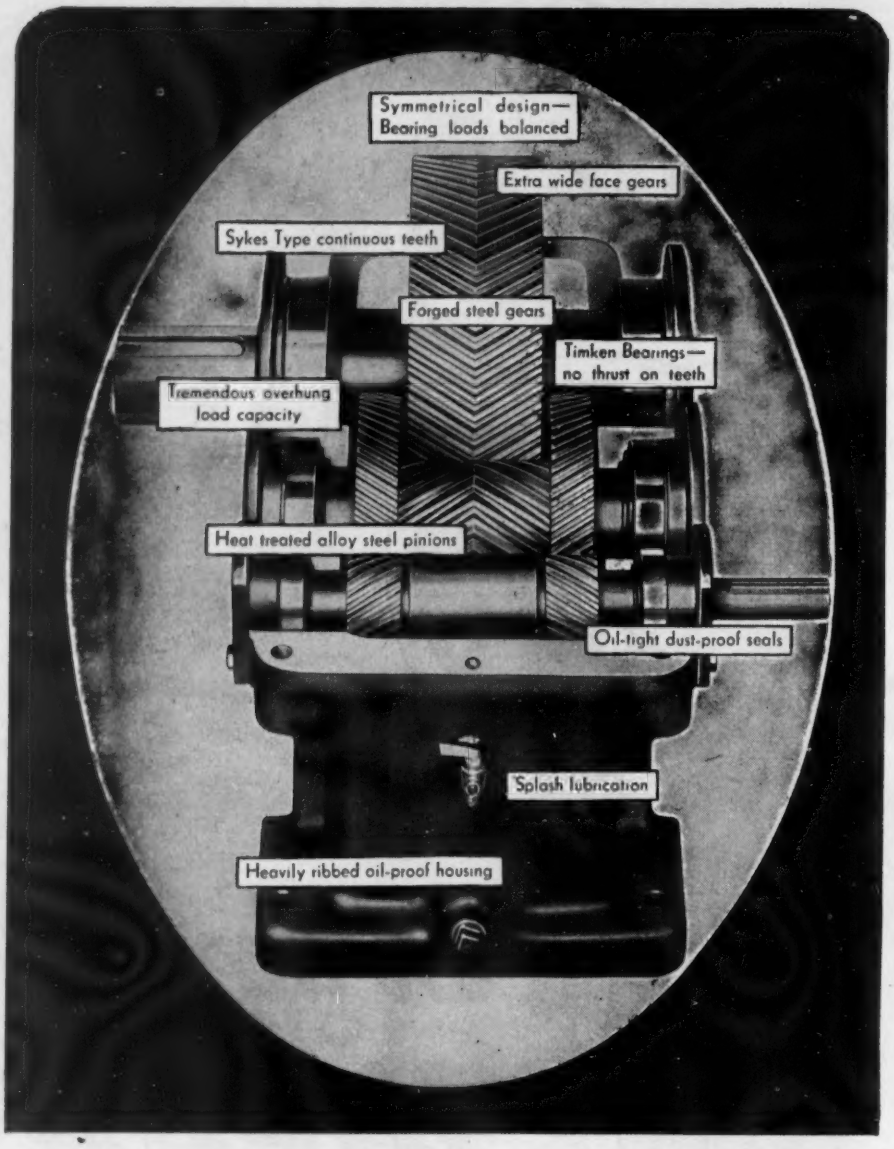


H & S HERRINGBONE SPEED REDUCERS
have 10 points of superiority

★ **The features shown in the above illustration of the double reduction Horsburgh & Scott Herringbone Speed Reducer are found also in the single and triple reduction Herringbone units. Extreme accuracy, herringbone tooth design and the locking of gears between oversize Timken roller bearings insure quiet, smooth operation . . . maintenance cost is close to the zero point and depreciation is exceedingly low, even under very heavy shock loads and other difficult conditions of service.**

Send note on Company Letterhead for Speed Reducer Catalog 39

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 HAMILTON AVENUE • CLEVELAND, OHIO, U. S. A.

Automatic Welding

(*Concluded from Page* 103)

rheostat, while keeping his eye on the speed indicator. Actual range is about 0.3 to 3 rpm of the table. As the ratio from motor to table is 860:1, there is ample torque even at 0.3 rpm.

In order to bring work to the proper starting point the operator can, by pressing the appropriate button, rapidly traverse the table regardless of the operating speed setting and without interfering with it. When contact has been made, and rod is covered by flux, operator presses either the *weld forward* or *weld reverse* button, welding and table motion starting simultaneously. If during the operation, particularly while welding first pieces of any given run, it is felt that the weld could be improved by a change in table speed, operator can easily correct this from his control station while still observing the work. When weld is completed, operator presses the mushroom-head *stop* button; welding stops, table stops, and welding rod retracts about ¾-in. This is entirely automatic.

All Controls Centralized

For setup, welding rod can be manipulated accurately and simply. Originally, this was done to jogging, and required considerable skill just to make contact. With V-S control, welding rod can be made to creep down to contact with work, or reversed and moved away. As originally designed, two men were required for setup. This was due to location of the various controls at widely separated points. With the portable control station combining at one point all necessary controls, setup can be completed by one man.

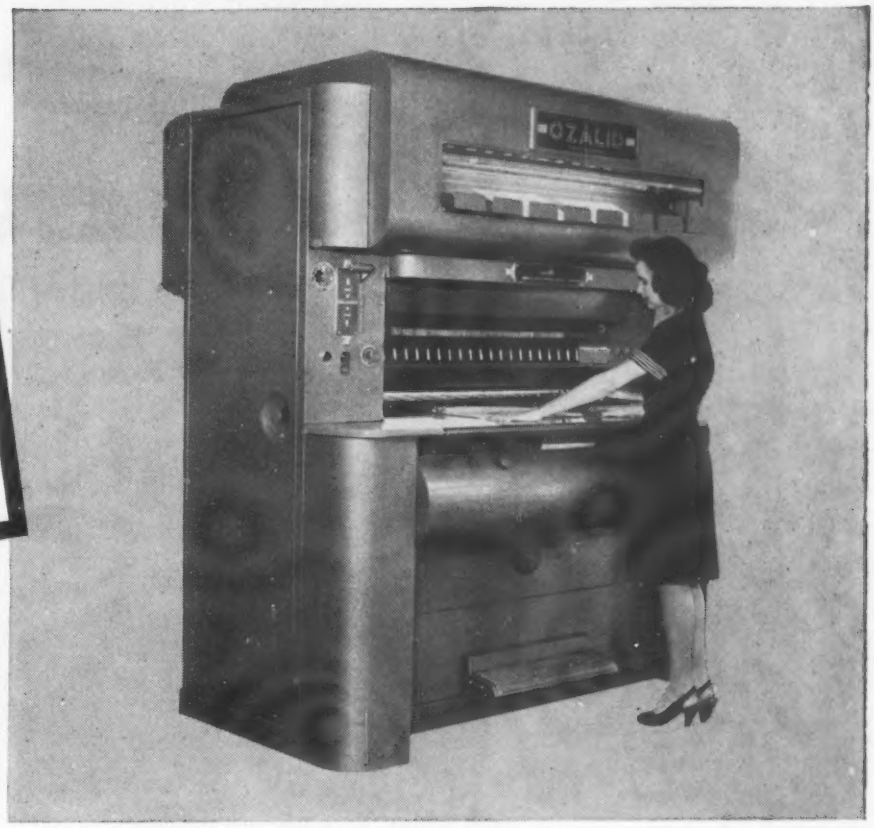
Equipment is simple. Motor is connected by V-belt to the reducer, shown in Fig. 1. A single, light chain transmits power directly from reducer to table drive shaft. Special control panel shown in Fig. 3 would have been considerably smaller if it had been used only for control of the V-S drive. However, in addition to providing the starter for the V-S control units and the set for operating the wire feed motor, it also contains reversing contactors for the wire feed motor and table motor, table dynamic braking and rapid traverse relay, as well as reversing contactors for the tilt motor. This single control simplifies the machine wiring, making it possible to combine all controls in a single portable station.

As in all automatic operations using inexperienced operator, the time of setup man is required. An operator, however, can become sufficiently familiar with the machine so that within a period of 30 days, he can become his own setup man. Good results in welding can be obtained by some inexperienced operators with as little as 48 hr of instruction and supervision. Table speeds can be set by anyone who is capable of reading a dial.

New! The OZALID PRINTMASTER

...Does the work of any two other printmaking machines!

- ✓ 22 features save time, labor, money!
- ✓ Makes "impossible" orders easy to fill!
- ✓ One operator does the work of three!
- ✓ Automatically stacks originals and prints!
- ✓ Makes all 10 types of Ozalid prints in seconds!



To Reproduce your engineering drawings, operation sheets, typed reports, and other material . . . you may be using two, three, or more printmaking machines.

Even so, you are probably *not* equalling the volume you could turn out with ONE Ozalid Printmaster and ONE operator!

The OZALID Printmaster provides speed, flexibility, and versatility never before available for large-volume printmaking. It makes "impossible" orders easy to fill. It simplifies the operator's job with automatic controls that set new standards for dependability. And it allows you to utilize fully the versatility that *only* the Ozalid Process affords!

All 10 Types of Ozalid prints (on paper, cloth, foil, or film) are made *in seconds* with the *Printmaster*. There are just two steps, both automatic: Exposure, and *Dry* Development. To make a black-line, blue-line, or red-line paper print from an average pencil tracing takes only *7 seconds*. An ink tracing reproduces even faster. Beautiful Ozalid *Dryphotos*—continuous-tone *photographic* prints—take only a few seconds longer!

One Operator easily does the work of three . . . as all controls are automatic or require only "finger-tip" attention.

Both your originals and your finished prints are AUTOMATICALLY *returned* and *stacked* in correct order! The prints can be stacked either in the front or the rear receiving tray—and the *change* from front to rear can be made instantly!

Ozalid Electronic Speed Control permits instant shifting to any speed between zero and 30 feet per minute.

Altogether, there are 22 new design features for more efficient operation!

The Saving in Time and Labor alone will soon "write off" the cost of *your* Ozalid *Printmaster* . . . and then go on to pay dividends for years.

Maintenance requirements are few . . . and if your floor space is at a premium, the *Printmaster* can help—it requires *only 18 square feet*.

In addition to reducing your present printmaking costs, you'll find that the *Printmaster* will extend your use of prints to all departments . . . allowing you to establish new and more economical routines, and do jobs you never considered within the scope of technical reproduction equipment.

SEND FOR THE FREE *"OZALID PRINTMASTER BOOKLET"*—containing samples of the 10 different types of prints you can make.

OZALID

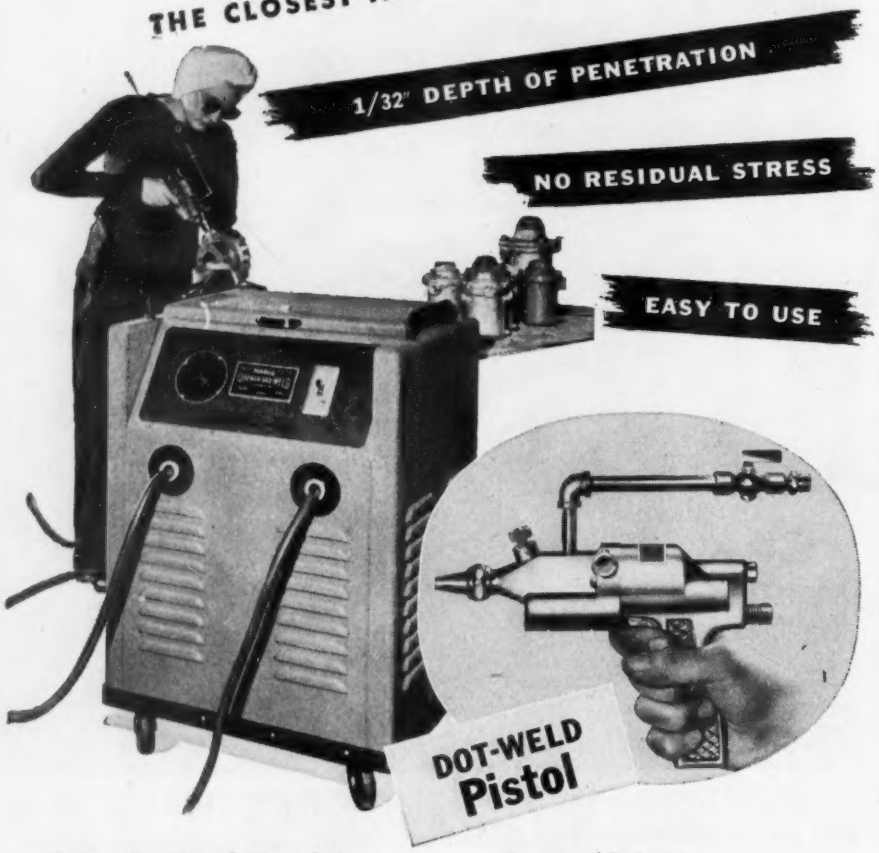
DIVISION OF GENERAL ANILINE AND FILM CORPORATION • JOHNSON CITY, N. Y.

OZALID IN CANADA—HUGHES-OWENS CO., LTD., MONTREAL

Salvage Defective Castings by the New Mogul

•DOT-WELD PROCESS

THE CLOSEST APPROACH TO A COLD WELD



Using the Mogul Quench-Arc-Weld Machine and the Dot-Weld Pistol

Process and Equipment PATENTED

Now you can reclaim defective ferrous and some non- ferrous castings without fear of setting up residual stresses, or crystallization by the Dot-Weld Process. It affords a fast fill-in of aluminum, nickel, bronze or zinc which can be applied to any metal and is readily machineable. In addition to reclaiming defective castings, Dot-Welding is being used for press fit work, local nickel clad to eliminate corrosion and other applications never before possible.

DOT-WELDING UTILIZES the new Mogul Quench-Arc-Weld Machine, a high amperage, low voltage transformer and the unique Dot-Weld Pistol. This combination affords a depth of penetration up to 1/32" yet the specially designed air pressure unit of the pistol quenches the arc in a constant stream of cooling air.

No foundry, machine, welding or pattern shop can afford to be without the remarkable Dot-Weld Process.

METALLIZING COMPANY OF AMERICA
INDUSTRIAL DIVISION
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WRITE FOR NEW BULLETIN

Special Steel Shapes

(*Continued from Page* 107)

priority, Lukens Steel Co., Coatesville, Pa., commissioned United Engineering & Foundy Co. to build a special shape mill for rolling them. Lukenweld Inc., company's subsidiary, had orders for assemblies in which these sections were included primarily to reduce machining time required to make them from solid slabs. Owing to the limited tonnage involved, space available, and other factors, a 1-stand 30-in. 2-high reversing screwdown mill was installed. As the required sections never were rolled on a mill of this type before, naturally many unique ideas were incorporated to make a successful operation. Anticipating the need for some changes in roll design, built-up rolls using forged alloy mandrels and rings of a special grain iron at first were applied. This type roll later was replaced with special alloy steel rolls, cast solid, which are now being used and have proven satisfactory for the shapes illustrated and for others not shown. Other parts can and no doubt will be rolled on this mill as competitive conditions are fully restored.

Design Changes Due

Edward J. Charlton, assistant to president of Lukenweld, in his article, "Trends in Use of Welded Machinery", attributed the substantial increase in this field to the abnormal urgency of acquiring necessary parts as quickly as possible and by any means. Great quantities of duplicate weldments have been fabricated, whereas, under normal conditions, the investment in plants and tooling required to produce these parts might have awaited economic justification. However, he believes that certain changes in design criteria are due because weldments have been applied to machines the overall design of which has been frozen for one reason or another and that, consequently, the possible superior advantages of weldments have been submerged.

Coincident with recognition of the need for redesigning steel structures embodying numerous standard shapes, there is raised the question of their suitability; moreover, if the designer sees a place for a special section which alone will withstand stresses to be imposed, or will satisfy the dictates of style and function, he usually finds himself in a blind alley when he tries to get it. That is one reason why Mr. Conley recommends sticking to existing shapes for new designs until such time as the modified angles, channels, etc. are made as stock items.

Any consideration of the philosophy of design directs attention to the means of fabricating components. While the mills eventually may be persuaded, with an inducement of large volume, to set up rolls and install special mills for modifications of the common-garden kind of structurals, it is regarded in

FASTEST most efficient for UNLOADING SHEET STEEL and for other point-of-operation jobs!

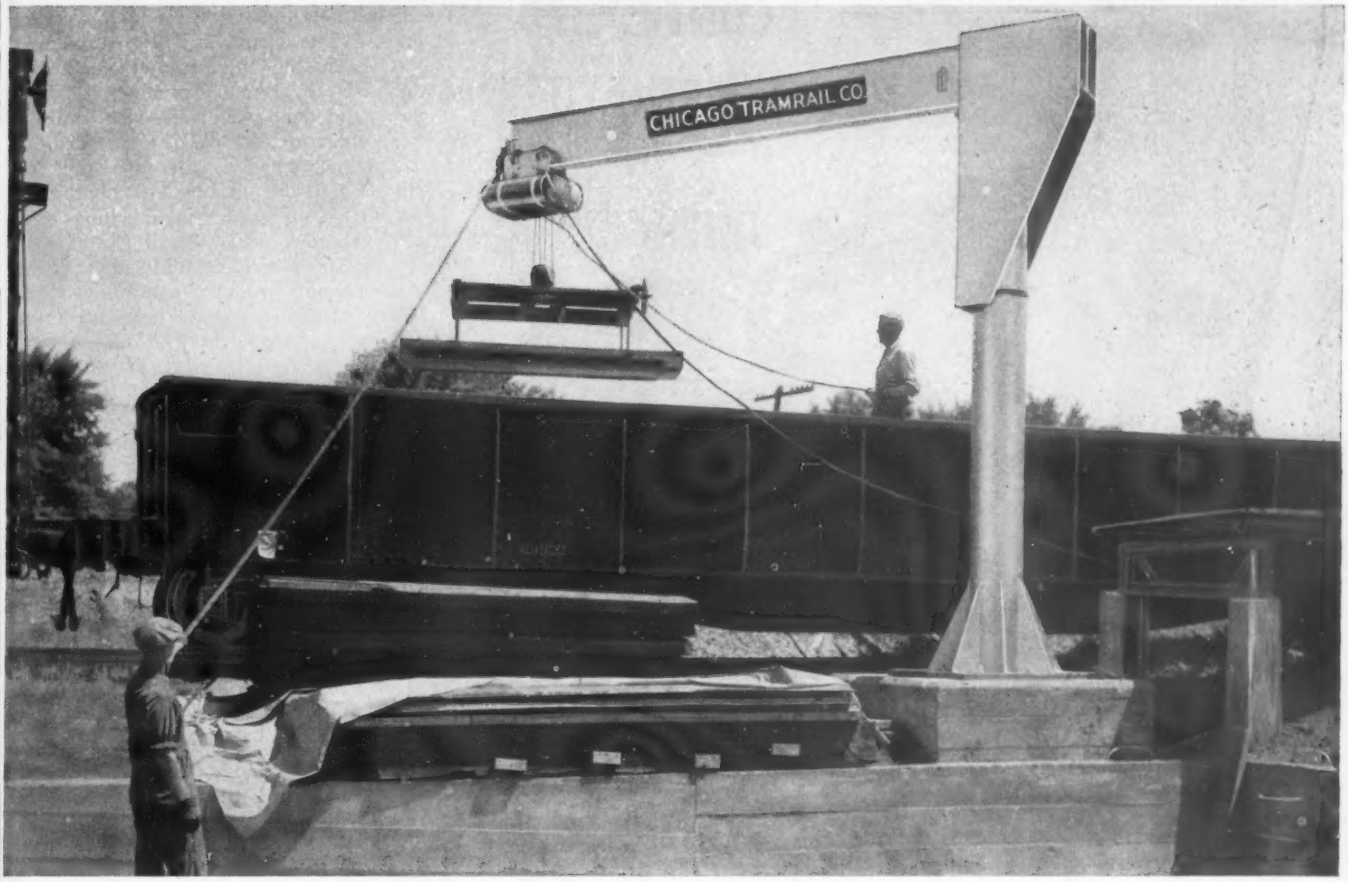

Photo Courtesy Ice Cooling Appliance Co., Morrison, Illinois

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some quarters as unreasonable to expect steel producers to match, for one example, the variety of intricate nonferrous shapes produced on extrusion presses. Sound economic grounds for such competition are lacking. If only a few steel parts of a kind are wanted, there is always the vast array of cold bending and forming machinery, ready to be thrown into the breach. Among the latter are versatile tangent benders, stretching machines, mandrel-type forming and shaping equipment, and ingenious new die setups for metalworking presses. These can and will give splendid service in the interim and eventually may take over much production which never can qualify with the steel mills.

Manufacture of some of the specialized tubing mentioned by Mr. Conley is accomplished on ultramodern continuous production lines in which rolling mills are supplemented by either gas or electric resistance welding units, all operated automatically from a central station. These straight-line tube mills for forming and joining strip into tubing with a wide range of wall thicknesses and diameters stand forth as proof that some progress has been made. (See STEEL, Aug. 14, 1944, p. 104; Feb. 26, 1945, p. 84). But the fundamental principle of progressive rolling to shape is the same as that employed for past operations, difference being the use and arrangement of spool-type rolls.

Steel Tubing Favored

Paralleling the popularity of nonferrous tubing for aircraft applications, steel tubing has steadily gained favor with designers. In designing a radically new grader for highway construction, the individual parts of the machine were looked upon by the manufacturer as an arrangement of steel pieces to fit the design. Structural members — including plates, tubing, angles, channels, etc. — were studied to determine the assembly of parts that would best meet functional requirements. This analysis resulted in utilization of tubular members and reinforcing steel parts to obtain a triangular telescopic boom which can be extended up to 12 feet. Boom assembly consists of two main triangular assemblies, one telescoping within the other, and actuated hydraulically. Both assemblies are carefully reinforced at points of stress and all excess weight is eliminated wherever possible without sacrificing strength and rigidity. High strength was essential because the boom must rotate through a complete arc of 360 degrees. It is significant that without steel tubing of the right size, weight and strength, this structure would have been impossible to create.

A disposition to throw in the towel over the difficulty of adapting available shapes for use in welding is not general. Some fabricators have seen new possibilities in existing sections. One of these is Austin Co., Cleveland. J. K. Gannett, vice president, recently announced a new design for welded trusses of standard 50, 60, 70 and 80-ft lengths,

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wherein, for the first time H sections with their webs in a vertical plane are used throughout the structure, without benefit of gusset plates. This truss is readily adaptable in building construction to different loadings simply by changing the weight of beams used for various truss members. By keeping fixed depth of individual members, these variations require no changes in shop detail or fabricating jigs. As top chord is a wide flange beam, it carries purlins at a variety of spacings without regard to panel point, and also is adaptable to continuous uniform loading. Similarly, the bottom chord is capable of carrying loads at any point and itself can be used as a monorail. Fabrication of a 50-ft truss requires total of 41 lineal feet of fillet weld, all accomplished by down welding. H sections are assembled in a jig, tack welded, and welding is completed with the truss in a vertical position. Because it is fabricated completely from rolled members which are simply cut to length desired, no splitting, blocking or chipping is necessary.

Pilot Mill Suggested

In aggregate, the requirements for special shapes designed for welding are thought to be substantial, but to date there is no well defined plan for placing in production even the few modified angle, channel and semicircular shapes in which there is a known interest. As for the balance, there are only suggestions. From one quarter comes the proposal to equip metalworking plants in need of them with vest-pocket rolling mills of the kind featured in recent experiments. Officially, they are known as pilot mills, and up to the present have been used mostly to aid in checking physical specifications in relation to chemical composition; in some cases, for rolling strip stock to uniform gage.

Another proposal, which has been upheld as a logical solution, is that fabricators most interested in this program hold a meeting, appoint an examining committee from among their numbers, and endow that committee with sufficient authority to screen all suggestions for non-standard shapes. The committee would analyze each idea submitted for its relationship, if any, to other requirements and to existing shapes. It would reject those ideas which were utterly impractical, and then determine by this process of classification and elimination not only how many groups of related shapes there were, but how many sizes of each type within a group and the estimated tonnage of each type by sizes, based upon an average of past and anticipated annual requirements. After this more or less standardized list of items had been approved by a majority of the fabricators, it could be turned over to the shape mills for roll designers to decide which sections were feasible; also for mill officials to scan it for tonnages that could be handled on terms consistent with policy. This standardized list could be reviewed from time to time to eliminate undesirable items.

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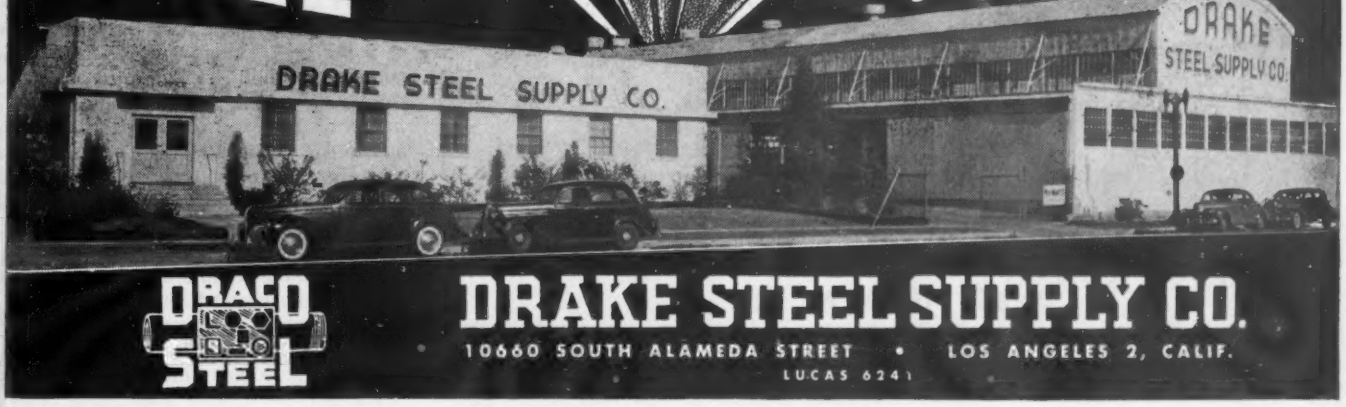

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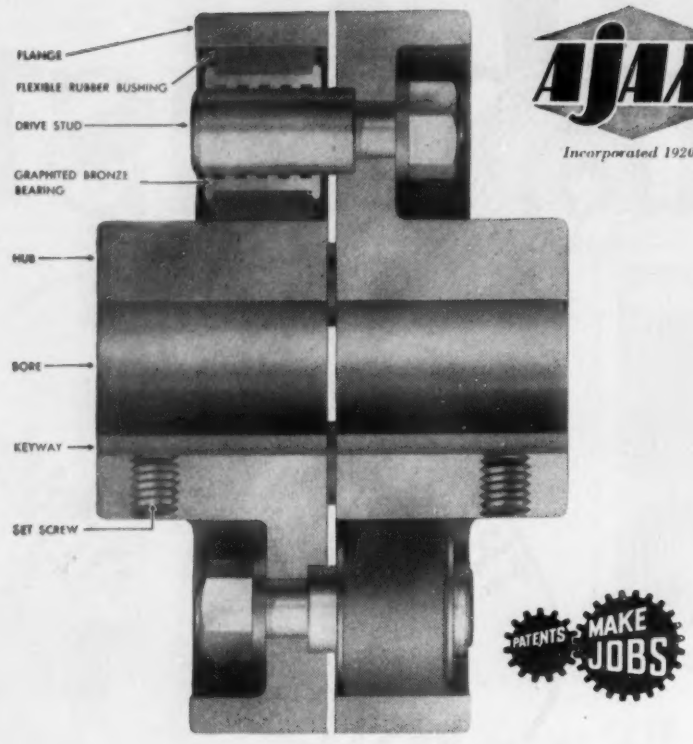

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AJAX FLEXIBLE COUPLING CO. INC.

WESTFIELD, N. Y.

Colorimetric Analysis

(*Continued from Page* 130)

gravimetric procedures. More refined methods, such as elimination of chromium and more efficient removal of iron, could be used to lower the percentage error and extend the method to lower percentages of aluminum. To obtain the approximate speed with which a determination can be run, Cratt and Makepiece cite the analysis of four steels for aluminum by the method described in an elapsed time of 4 hr. Their prediction was that a large number of samples could be run more efficiently if apparatus were available to make full use of battery methods.

Determination of Silicon in Low Alloy

David Rozental and H. C. Campbell[1] recently have described a new method for silicon analysis in iron and steel products which appears to be ideally suited to the needs of the industrial laboratory. Routine accuracy of plus or minus 0.02 per cent silicon is secured, which is usually considered satisfactory for most steel analysis. As in the case of the improved method for aluminum analysis discussed in a preceding section, the procedure for silicon analysis proposed by Rozental and Campbell is based on colorimetric techniques and is adaptable to many types of colorimetry instruments for rapid and routine analysis of alloy and stainless steels.

This method is based on the formation of a colored complex by the reaction of ammonium molybdate and silica in the presence of a mineral acid. The procedure is subject to interference only by chromium and it is shown that the influence of chromium is in direct proportion to its percentage in the sample. Means of correcting for this interference by calculation rather than by the use of blank solutions are described. Although the approximate chromium content of the steel must be known in order to correct for the interference of chromium, it is pointed out by the authors that average curves may be drawn for the general types of stainless steels, from which silicon can be estimated to plus or minus 0.04 per cent without knowing the chromium content.

Method: In the procedure for analysis, a 0.200 gram sample of the steel is dissolved in nitric-hydrochloric acids. This solution is diluted to exactly 100 milliliters and a 25-milliliter portion taken, to which is added 5 milliliters of 10 per cent ammonium molybdate solution. Six minutes time is then allowed for development of maximum intensity of the yellow silicomolybdate complex. Ten milliliters of 2 per cent sodium fluoride solution is added and readings made immediately in the photometer at a wave length of 4200 microns. The instrument is previously adjusted to read 100 per cent transmittance for distilled water. The authors used for their measurements a Coleman Model 11 Spectrophotometer in matched cuvettes of 20 mm optical depth; however, they state that the method is adaptable to many types of colorimetry instruments.

Accuracy: Of the elements commonly present in alloy steels, chromium appears to be the only one which interferes with

the proposed procedure. Phosphorus and iron are decolorized by the sodium fluoride addition. Inasmuch as chromium does interfere, the fundamental calibration curve must be obtained by use of mild steel or low alloy steels containing little or no chromium. Such a curve, constructed by Rozental and Campbell, is indicated by Curve I in the accompanying illustration.

In experimental work, these men found that the deviation from this curve produced by chromium was directly proportional to the percentage of chromium in the sample. Curves II and III in the graph are transmittance curves for stainless steels containing silicon. Table II shows the accuracy of the method in typical routine analysis when checked against standard National Bureau of Standards samples.

In general, Rozental and Campbell concluded that in using precalibrated curves for various general types of steel, silicon can be determined with an accuracy of plus or minus 0.04 per cent silicon without correcting for chromium or plus or minus 0.02 per cent when the correction is made. According to the results cited from routine analysis, a single determination takes about 30 min. Two determinations can be completed in 45 min and 10 in about 3 hr.

REFERENCES

[1]Manasco Mfg. Co., Burbank, Calif. For complete details of the method, see *Industrial and Engineering Chemistry*, Analytical Edition, April, 1945.

[2]Research and Engineering Department, Arcos Corp., Philadelphia. For complete details of this method see *Industrial and Engineering Chemistry*, April, 1945.

Booklet Describes Power Distribution Systems

A publication entitled "Electric Power Distribution for Industrial Plants," sponsored by a committee on industrial power applications, is available from American Institute of Electrical Engineers, 33 West 39th street, New York 18. Report outlines engineering principles of distributing power in industrial establishments, analyzes service requirements, voltage regulation problems, load characteristics and distribution system characteristics, and deals with selection of equipment for distribution systems. Operating and maintenance problems are considered only as they affect system and equipment selection. It covers system planning, primary substations and feeders, transformers, primary switchgear and low-voltage feeder protection, low-voltage feeders, panelboards, bus distribution systems and load circuits, fault current calculations, and wires and cables.

—o—

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THE BUSINESS TREND

Wide Scope Seen for Business Enterprise

IMPACT of unexpectedly early peace that caught business unprepared for wide-scale, speedy reconversion to civilian goods output has resulted in a precipitate drop in industrial production, with steel ingot output pacing the decline.

Last week's records were not true measuring sticks of what the end of war did to business activity for they included not only the jolt of immediate and drastic cutbacks and terminations of war contracts but also the effect of a two-day national celebration during which most plants and stores were closed.

Despite the shocks attending cessation all at once of an immense amount of war work, some economists optimistically view the situation as one that is conducive to reconversion's being more rapid than otherwise, for the wholesale lifting of governmental controls gives industry a wide scope for enterprise. Piecemeal reconversion, those economists hold, would have been accompanied by restrictions that would have retarded readjustment.

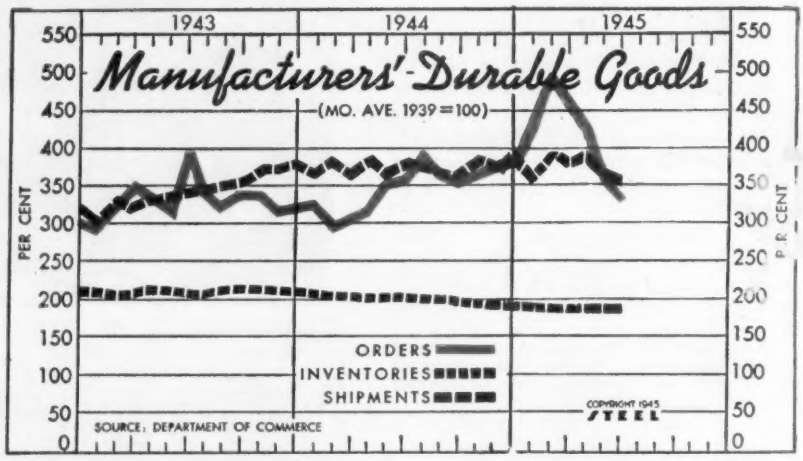
STEEL—While steel ingot production has dropped to its lowest point since Pearl Harbor, the drop is viewed as a natural and temporary accompaniment to the revision of mill schedules in preparation for all-out reconversion which is expected to produce a quick and substantial return to high-level ingot output.

AUTOMOBILES—Also cut by the two-day victory observance was automobile output last week to 11,505 units, after each of the previous two weeks had brought new highs for production since resumption of civilian car manufacture began July 1.

STOCK MARKET—Brokers were pleased with the immediate stock market reaction to peace and flood of war contract terminations. After the two-day victory observance which provided time for investors to consider probable effects of early peace, the stock market did not go into a drastic decline. Instead, at the close of the week the Dow-Jones industrial-share average was down only three-quarters of a point for the week, and the rail-share average was off approximately 3¼ points.

COAL—Ending of the war will ease the nation's anticipated coal crisis. The Army has cut back its demands by 145,000,000 tons over the next 12 months. Reappraisal of the supply situation indicates that householders should get as much bituminous coal as they received last winter. However, government officials are not as optimistic about the supply of anthracite.

BUSINESS FAILURES — Commercial and industrial failures during victory holiday week were lower than any week on record. This was the third consecutive week of decline.



Index of Manufacturers' Durable Goods
(Mo. Ave. 1939 = 100)

	Orders		Shipments		Inventories	
	1945	1944	1945	1944	1945	1944
January	427	332	354	364	190	212
February	484	294	394	384	189	209
March	463	310	382	377	189	207
April	422	325	389	389	189	205
May	351	352	361	371	189	204
June	334	359	355	383	189	204
July	...	393	...	373	...	202
August	...	367	...	366	...	201
September	...	346	...	372	...	199
October	...	367	...	380	...	197
November	...	372	...	374	...	195
December	...	378	...	390	...	192
Average	...	350	...	377	...	202

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	60	88.5	90	97
Electric Power Distributed (million kilowatt hours)	3,939	4,395	4,385	4,451
Bituminous Coal Production (daily av.—1000 tons)	1,917	1,892	2,000	2,024
Petroleum Production (daily av.—1000 bbls.)	4,934	4,934	4,944	4,675
Construction Volume (ENR—Unit $1,000,000)	$49.1	$30.2	$50.1	$42.3
Automobile and Truck Output (Ward's—number units)	11,505	20,790	18,080	18,800

*Dates on request.

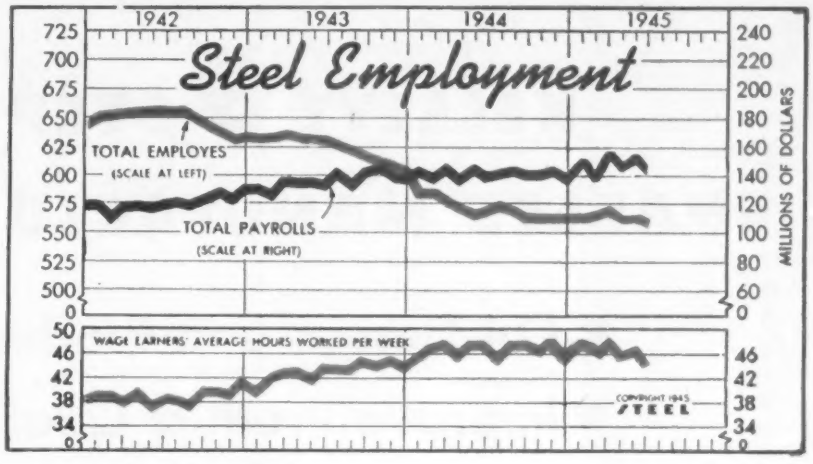
TRADE				
Freight Carloadings (unit—1000 cars)	717†	870	882	887
Business Failures (Dun & Bradstreet, number)	5	8	12	19
Money in Circulation (in millions of dollars)‡	$27,351	$27,269	$26,901	$23,020
Department Store Sales (change from like week a year ago)‡	+18%	+22%	+15%	+13%

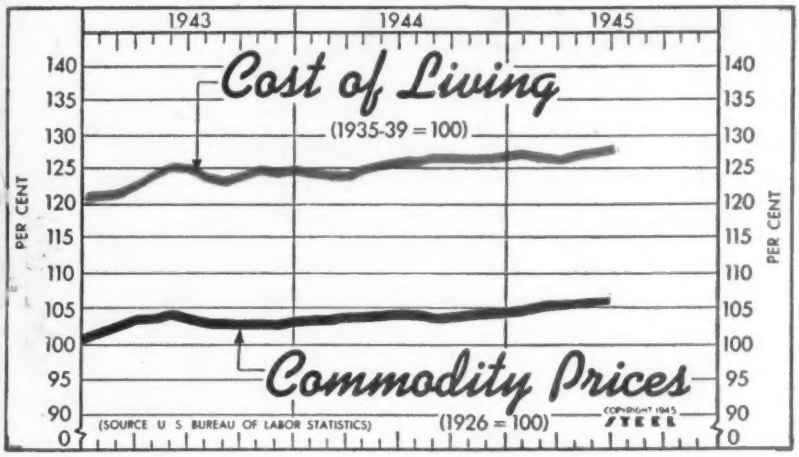
†Preliminary. ‡Federal Reserve Board.

Steel Employment

	—Employes— (000 omitted)			—Total Payrolls— (Unit—$1,000,000)		
	1945	1944†	1943	1945	1944	1943
Jan.	564	583	637	$150.3	$141.8	$129.7
Feb.	566	583	635	138.4	137.6	122.8
March	570	578	637	155.0	145.3	136.8
April	567	573	634	147.0	138.9	133.3
May	565	569	632	154.0	145.4	137.4
June	562	570	631	144.1	140.5	136.2
July	...	571	627	....	141.8	142.8
Aug.	...	569	625	....	143.9	139.9
Sept.	...	565	620	....	142 2	143.8
Oct.	...	564	615	....	141.7	144.9
Nov.	...	561	611	....	143.1	141.5
Dec.	...	564	605	....	139.9	140.2

† Monthly average; previous reports showed total number regardless of whether they worked one day or full month.





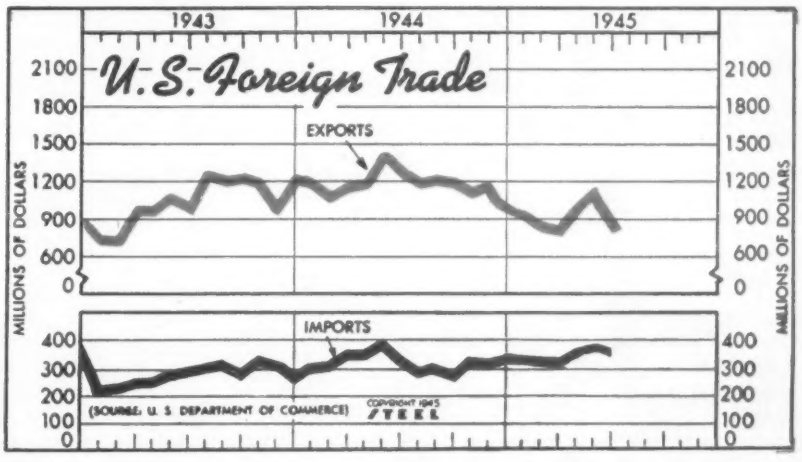
Whole Commodity Price— Cost of Living Indexes

	—Commodities— (1926=100)			—Living Cost— (1933-39=100)		
	1943	1944	1943	1945	1944	1943
Jan.	104.9	103.3	101.9	127.1	124.2	120.6
Feb.	105.2	103.6	102.5	126.9	123.8	120.9
Mar.	105.3	103.8	103.4	126.8	123.8	122.8
Apr.	105.7	103.9	103.7	127.1	124.6	124.1
May	106.0	104.0	104.1	128.1	125.1	125.1
June	106.1	104.3	103.8	129.0	125.4	124.8
July	....	104.1	103.2	....	126.1	123.8
Aug.	....	103.9	103.1	....	126.4	123.2
Sept.	....	104.0	103.1	....	126.5	123.9
Oct.	....	104.1	103.0	....	126.5	124.4
Nov.	....	104.4	102.9	....	126.6	124.1
Dec.	....	104.7	103.2	....	127.0	124.4
Ave.	....	104.0	103.2	....	125.5	123.5

Foreign Trade
Bureau of Foreign and Domestic Commerce

(Unit Value—$1,000,000)

	—Exports—			—Imports—		
	1943	1944	1943	1945	1944	1943
Jan.	900	1,124	730	334	300	228
Feb.	882	1,086	719	324	313	234
Mar.	881	1,197	988	324	359	249
Apr.	1,002	1,182	980	366	359	258
May	1,137	1,419	1,085	372	386	281
June	881	1,271	1,002	357	330	295
July	....	1,198	1,262	...	293	300
Aug.	....	1,207	1,204	...	302	315
Sept.	....	1,199	1,235	...	280	285
Oct.	....	1,140	1,195	...	327	329
Nov.	....	1,184	1,074	...	322	317
Dec.	....	934	1,244	...	336	281
Total	....	14,141	12,718	...	3,907	3,372



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$7,847	$10,837	$11,850	$8,989
Federal Gross Debt (billions)	$263.0	$262.7	$261.8	$210.1
Bond Volume, NYSE (millions)	$18.1	$25.2	$28.8	$27.2
Stocks Sales, NYSE (thousands)	3,096	5,335	5,229	4,722
Loans and Investments (billions)†	$63.1	$63.7	$64.2	$56.5
United States Gov't. Obligations Held (millions)†	$46,771	$47,000	$47,338	$42,289

†Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$58.27	$58.27	$58.27	$56.73
All Commodities†	105.7	105.7	105.6	104.0
Industrial Raw Materials†	117.7	118.1	117.6	114.3
Manufactured Products†	102.0	101.9	101.9	101.1

†Bureau of Labor Statistics Index, 1926 = 100.

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5 Engineering Testing through mechanical and chemical laboratory evaluation.

And finally, and most important—

6 *Metal and Wood Manufacture, specializing in sheet metal and welded steel assemblies.*

Not least among the advantages of the Kellett Plan are the economies it assures in design, production and capital expense, through the services of a highly skilled, outside technical and working force. The Kellett staff operates under experienced supervision. Its modern plants are specifically equipped to handle complex engineering and quantity production jobs in metal, wood and other materials.

For detailed information, write to Kellett Aircraft Corporation, Department SC-2, Upper Darby (Philadelphia), Pa. An outline of the general nature of your present or postwar design or production problem would enable us to set forth the possible ways in which Kellett may prove helpful in solving it.

KELLETT

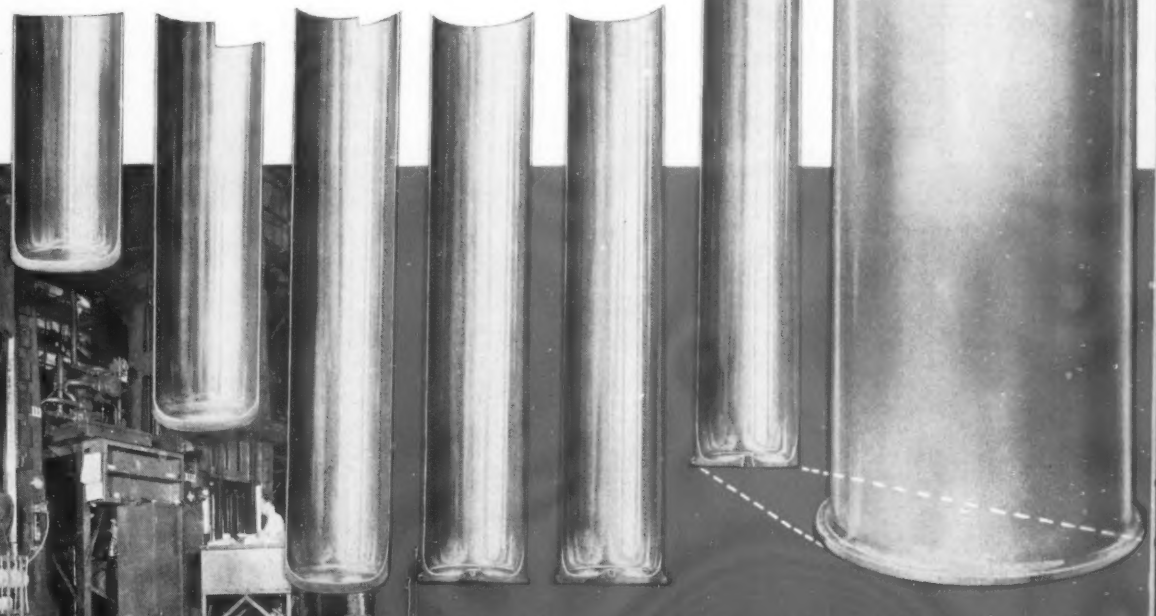
Of course it's Brass

FOR THE NAVY'S BIGGEST CARTRIDGE CASES

It's Brass because no other metal has such fabricating possibilities. The Norris Stamping and Manufacturing Company of Los Angeles has successfully produced thousands on thousands of these 38.2″-long cases for the Navy's newest and largest semi-fixed ammunition, servicing a light cruiser's main battery of 6-inch, 47-caliber guns.

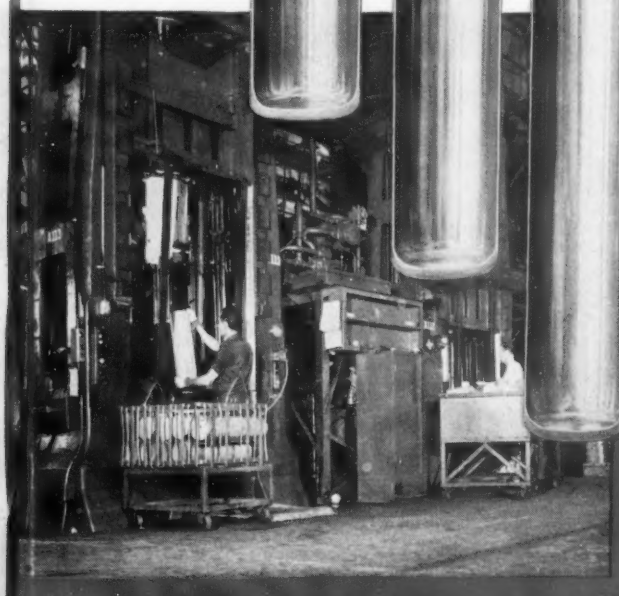
The American Brass Company supplied the 31.5-pound discs for this job; 12.75″ diameter by .800″ thick, made of 70-30 Anaconda Cartridge Brass. Composition, dimensions and anneal were held to unusually close limits—determined by the operations shown in the cut-away sections below. Surface finish, too, was important, for the finished case had to be smooth and free from defects.

It's on jobs like this that The American Brass Company's "century of metallurgical experience" may mean the difference between an ordinary or an *outstanding* finished product.



THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut
Subsidiary of Anaconda Copper Mining Company
In Canada: ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*



One of the many hydraulic presses used for drawing 38.2″-long brass cartridge cases for the Navy's 6-inch, 47-caliber guns. Norris Stamping and Manufacturing Company, Los Angeles.

ANACONDA
from mine to consumer

Anaconda Copper, Brass & Bronze

Only a pound of Brass...

but what an example of workability!

This assortment of bellows is typical of those made by The Fulton Sylphon Co., of Knoxville, Tennessee, for more than 40 years. Applications of such thin-wall metal bellows in pressure and thermostatic devices are well known—in mechanical refrigerators, heating systems, automobiles, Diesel and aircraft engines, etc. But their availability, in sizes from 15/32" to 12" diameter, is a tribute to manufacturing ingenuity and precision . . . and to Brass. For Brass is the metal used for the vast majority of Sylphon Bellows for widely different, but equally important reasons:

In service, Brass provides corrosion resistance and the high endurance limit necessary to resist millions of cycles of reversed stress.

In production, Brass provides a combination of metal-working properties unequalled by any other metal. Starting from a flat disc, the metal is subjected to a series of cupping and drawing operations to produce a thin-wall tube which is subsequently formed into a deeply corrugated, seamless, precision unit. The cumulative effect of this cold working enhances the physical properties of the metal and contributes long life and dependability to the finished bellows.

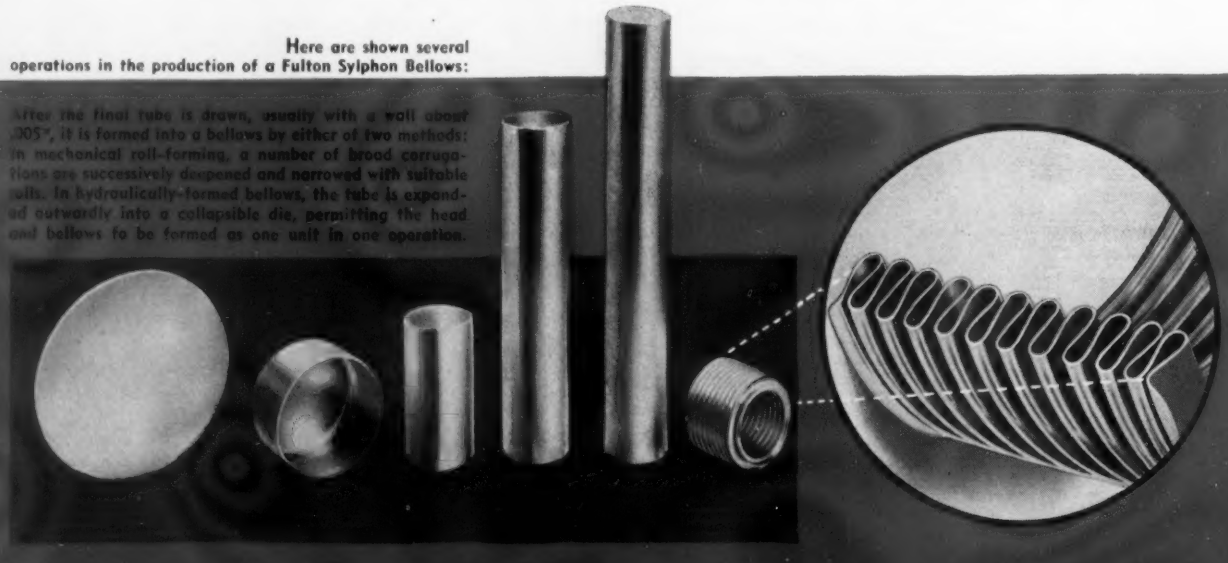
Knowing the fabricating operations involved, The American Brass Company supplies Brass, Phosphor Bronze and Beryllium Copper for Fulton Sylphon Bellows in the composition and form best suited to meet the unusually exacting requirements. 45158

THE AMERICAN BRASS COMPANY

General Offices: Waterbury 88, Connecticut
Subsidiary of Anaconda Copper Mining Company
In Canada: ANACONDA AMERICAN BRASS LTD., *New Toronto, Ont.*

Here are shown several operations in the production of a Fulton Sylphon Bellows:

After the final tube is drawn, usually with a wall about .005", it is formed into a bellows by either of two methods: In mechanical roll-forming, a number of broad corrugations are successively deepened and narrowed with suitable rolls. In hydraulically-formed bellows, the tube is expanded outwardly into a collapsible die, permitting the head and bellows to be formed as one unit in one operation.



ANACONDA

Anaconda Copper, Brass & Bronze

Steelmakers Digging Out Of Cancellation Landslide

Another week needed to give clear view of situation . . . Rapid rise to high production rate foreseen . . . Demand shows growth

STEEL mills are gradually working out from the avalanche of war-end cancellations. Another week or ten days may see most producers in a position where they can set up schedules fairly accurately and know what they can expect with regard to further cancellations and ability of leading customers to take in tonnage already ordered for peacetime operation. By that time, and possibly before, they should be better able to appraise the outlook with respect to the relatively few production and inventory controls remaining.

Most cancellations are over and have been so heavy and the paper work so involved that many steel finishing departments have been forced to suspend until they could reach some degree of order. As a result there has been considerable delay in shipments scheduled currently, to say nothing of scheduling of new orders. However, the past few days have witnessed resumption of work in a number of such departments. Some operations, however, have not been severely affected, notably in some plate mills. While there have been many cancellations, with probably more to follow, most came before the end of the war. As a result plate producers have been in better position than many to absorb the shock of recent curtailments. Some shape mills are in about the same position, though others have been hit hard.

Many cancellations are yet to come, involving substantial tonnages, reflected in the fact that late last week a number of mills had received relatively few from subcontractors. In an effort to expedite necessary cancellations as rapidly as possible and thus know where they stand some mills have asked branch offices to canvass customers with war work, to see if the steel can be wiped off books.

DISTRICT STEEL RATES

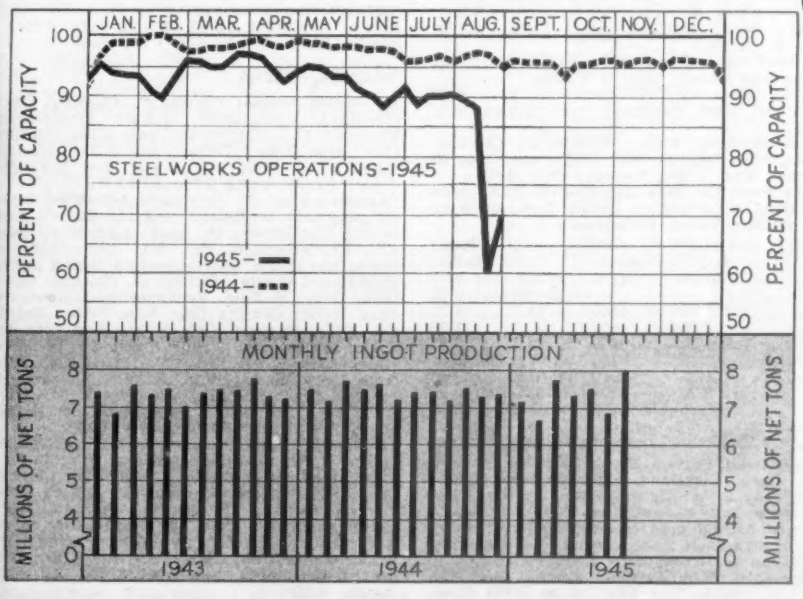
Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Aug. 25	Change	Same Week 1944	Same Week 1943
Pittsburgh	50	+ 5	90.5	98.5
Chicago	80.5	+40.5	97.5	99
Eastern Pa.	70	— 7	93.5	95
Youngstown	72	+19	92	98
Wheeling	96	+25.5	92	103
Cleveland	77	+27	90	94.5
Buffalo	62.5	None	90.5	90.5
Birmingham	95	None	95	95
New England	78	— 6	80	97
Cincinnati	86	+28	88	92
St. Louis	65	+15	87	89
Detroit	81	+19	82	83
Average	70	+10	95	98.5

*Based on steelmaking capacities as of these dates.

While cancellations have far overbalanced new orders, demand has been expanding, some producers of diversified products believing that within another fortnight new business will exceed cancellations. One problem in setting up schedules is filing of unrated tonnages. Many have been long in their hands and others have been indefinite for many reasons. The time now has come when producers are beginning to ask customers to recheck on many of these unrated orders with regard to quantity and desired date of delivery. Even where fairly specific some questions have arisen. In some cases delivery was specified at 30 days after official V-J Day, opening the question as to what date would apply. In some of these cases substantial tonnages are involved and it is important to know what is intended and if the buyers actually will be able to take delivery at the time specified. Some producers have not yet attempted to clear such questions, particularly with regard to larger contracts, until they know more fully where they stand themselves.

The industry believes that the speed with which Washington has been releasing wartime restrictions will result in an early rebound in steel operations. Some leaders look for 80 per cent of capacity by early October and for still higher operations before the end of the year. A peak of 90 per cent within a few months is considered probable, assuming no undue labor disturbances.



Steel production last week rebounded from the low point of the prior week and the estimated national rate was 70 per cent of capacity, a rise of ten points from the low of 60 per cent. Pittsburgh rose 5 points to 50 per cent, Cleveland 27 points to 77, Detroit 19 points to 81, Chicago 40½ points from a revised low of 40, to 80½, Cincinnati 28 points to 86, Wheeling 31½ to 96, Youngstown 19 points to 72 and St. Louis 15 points to 65. New England dropped 6 points to 78 and eastern Pennsylvania 7 points to 70. Birmingham held unchanged at 95 per cent and Buffalo was steady at 62½ per cent.

With no deviation from Office of Price Administration ceilings average composite prices of steel and iron are unchanged.

COMPOSITE MARKET AVERAGES

	Aug. 25	Aug. 18	Aug. 11	One Month Ago July, 1945	Three Months Ago May, 1945	One Year Ago Aug., 1944	Five Years Ago Aug., 1940
Finished steel	$58.27	$58.27	$58.27	$58.27	$57.73	$56.73	$56.73
Semifinished Steel	37.80	37.80	37.80	37.80	36.45	36.00	36.00
Steelmaking Pig Iron	24.05	24.05	24.05	24.05	24.05	23.05	22.05
Steelmaking Scrap	19.17	19.17	19.17	19.07	19.13	19.17	18.65

Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; other, ——

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	Aug. 25, 1945	July, 1945	May, 1945	Aug., 1944
Steel bars, Pittsburgh	2.25c	2.25c	2.20c	2.15c
Steel bars, Philadelphia	2.57	2.57	2.49	2.47
Steel bars, Chicago	2.25	2.25	2.17	2.15
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.25	2.25	2.22	2.10
Plates, Philadelphia	2.30	2.30	2.26	2.15
Plates, Chicago	2.25	2.25	2.22	2.10
Sheets, hot-rolled, Pittsburgh	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.70	3.70	3.65	3.50
Sheets, hot-rolled, Gary	2.20	2.20	2.20	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.70	3.70	3.65	3.50
Bright bess., basic wire, Pittsburgh	2.75	2.75	2.64	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.90	2.90	2.82	2.55

Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$36.00	$36.00	$34.50	$34.00
Slabs, Pittsburgh, Chicago	36.00	36.00	34.50	34.00
Rerolling billets, Pittsburgh	36.00	36.00	34.50	34.00
Wire rods, No. 5 to ⅜-inch, Pitts.	2.15	2.15	2.05	2.00

Pig Iron	Aug. 25, 1945	July, 1945	May, 1945	Aug., 1944
Bessemer, del. Pittsburgh	$26.19	$26.19	$26.19	$25.19
Basic, Valley	24.50	24.50	24.50	23.50
Basic, eastern del. Philadelphia	26.34	26.34	26.34	25.34
No. 2 fdry., del. Pitts., N.&S. Sides	25.69	25.69	25.69	24.69
No. 2 foundry, Chicago	25.00	25.00	25.00	24.00
Southern No. 2, Birmingham	21.38	21.38	21.38	20.38
Southern No. 2 del. Cincinnati	25.30	25.30	25.30	24.30
No. 2 fdry., del. Phila.	26.84	26.84	26.84	25.84
Malleable, Valley	25.00	25.00	25.00	24.00
Malleable, Chicago	25.00	25.00	25.00	24.00
Lake Sup., charcoal del. Chicago	37.34	37.34	37.34	37.34
Gray forge, del. Pittsburgh	25.19	25.19	25.19	24.19
Ferromanganese, del. Pittsburgh	140.33	140.33	140.33	140.33

Scrap				
Heavy melting steel, No. 1 Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.56	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke				
Connellsville, furnace, ovens	$7.50	$7.50	$7.00	$7.00
Connellsville, foundry ovens	8.25	8.25	7.75	7.75
Chicago, by-product fdry., del.	13.35	13.35	13.35	13.35

STEEL, IRON RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941, Feb. 4, 1942 and May 21, 1945. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding etc., although only principal established basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to individual companies are noted in the table. Finished steel quoted in cents per pound.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton f.o.b. mill Kaiser Co. Inc., $43, f.o.b. Pacific ports.)

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop, $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $36; Detroit, del. $38; Duluth (bil) $38; Pac. Ports, (bil) $48. (Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Laclede Steel Co., $34 Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives. Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co., Kaiser Co. Inc., $58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $42. Detroit, del. $44; Duluth, billets, $44; forg. bil. f.o.b. Pac. ports, $54.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O. Geneva Steel Co., Kaiser Co. Inc., $64.64, Pacific ports.)

Open Hearth Shell Steel: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section; 3-12 in., $52; 12-18 in., excl., $54.00; 18 in. and over $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich. (Kaiser Co. Inc., $76.64, f.o.b. Los Angeles.)

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54, del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $36. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—⅜ in. inclusive, per 100 lbs., $2.15 Do., over ⅜—⅞-in., incl., $2.30; Galveston, base, 2.25c and 2.40c, respectively. Worcester add $0.10; Pacific ports $0.50 (Pittsburgh Steel Co., $0.20 higher.)

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3": Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham base 20 tons one size, 2.25c; Duluth, base 2.35c; Mahoning Valley 2.32½c; Detroit, del. 2.35c; Eastern Mich. 2.40c; New York del. 2.59c; Phila. del. 2.57c; Gulf Ports, dock 2.62c; Pac. ports, dock 2.90c, (Calumet Steel Division, Borg-Warner Corp., and Joslyn Mfg. & Supply Co., may quote 2.35c, Chicago base; Sheffield Steel Corp., 2.75c, f.o.b. St. Louis.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.80c.
(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100	(.15-.25 Mo) 0.70
			(.20-.30 Mo) 0.75
2300	1.70	4300	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.85	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.75c; Detroit 2.80c; Toledo 2.90c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City, New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.)

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.45c; Eastern Mich. 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c.

Iron Bars: Single refined, Pitts. 4.40c; double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, single ref., 5.00, double ref., 6.25c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.20c; Granite City, base 2.30c; Detroit del. 2.30c; Eastern Mich. 2.35c; Phila. del. 2.37c; New York del. 2.44c; Pacific ports 2.75c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.35c on hot carbon sheets, nearest eastern basing point.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.70c; Granite City base 3.80c; New York del. 3.94c; Phila. del. 3.87c; Pacific ports 4.25c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.36c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific ports 4.25c; copper iron, 3.90c; pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.25c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, **base, 2.85c; Granite City, base 2.95c;** Detroit, del. 2.95c; eastern, Mich. 3.00c; Pacific ports 3.50c; **20-gage;** Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.45c; Detroit del. 3.55c; eastern Mich. 3.60c; Pacific ports 4.10c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.30c	4.05c	3.30c
Armature	3.65c	4.40c	3.75c
Electrical	4.15c	4.90c	4.25c
Motor	5.05c	5.80c	5.15c
Dynamo	5.75c	6.50c	5.85c
Transformer			
72	6.25c	7.00c	.....
65	7.25c	8.00c	.....
58	7.75c	8.50c	.....
52	8.55c	9.30c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.05c; Eastern Mich. 3.10c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.50 lb. tin, $4.50; 0.75 lb. tin $4.65.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.25c; New York, del. 2.44c; Phila., del. 2.30c; St. Louis, 2.49c; Boston, del. 2.57-82c; Pacific ports, 2.80c; Gulf ports, 2.60c.

(Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. mill; Kaiser Co. Inc., 3.20c, f.o.b. Los Angeles. Central Iron & Steel Co. 2.50c f.o.b. basing points; Geneva Steel Co., Provo, Utah, 3.20c, f.o.b. Pac. ports.)

Floor Plates: Pittsburgh, Chicago, 3.50c; Pacific ports, 4.15c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del. 2.27c; Phila., del. 2.215c; Pacific ports, 2.75c.

(Phoenix Iron Co., Phoenixville, Pa., may quote carbon steel shapes at 2.35c at established basing points and 2.50c, Phoenixville, for export; Sheffield Steel Corp., 2.55c f.o.b. St. Louis. Geneva Steel Co., 3.25c, Pac. ports; Kaiser Co. Inc., 3.20c f.o.b. Los Angeles).

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester, $1 for Duluth).

Bright basic, bessemer wire 2.75c
Spring wire 3.35c
(Pittsburgh Steel Co., 0.20c higher.)

Wire Products to the Trade:

Standard and Cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, Duluth $2.90; galvanized, $2.55; Pacific ports ..... $3.40 and $3.05

Annealed fence wire, 100-lb., Pittsburgh, Chicago, Cleveland 3.20c

Galvanized fence wire, 100 lb., Pittsburgh, Chicago, Cleveland 3.55c

Woven fence, 15½ gage and heavier, per base column ..... .67c

Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 70; twisted barbless wire, column 70.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	56	33	⅛	24	3½
¼ & ⅜	59	40½	¼	30	10
½	63½	51	⅜	34	16
¾	66½	55	½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	61	49½	1¼	23	3½
2½-3	64	54½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-19	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. Sizes	B.W.G	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1⅝"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2⅝"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $43.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $45.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated, 5.00c. Tie plates, $46 net ton, base, Standard spikes, 3.25c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.; Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

Tung.	Chr.	Van.	Moly.	Pitts. base per lb.
18.00	4	1	...	67.00c
1.5	4	1	8.5	54.00c
....	4	2	8	54.00c
6.40	4.15	1.90	5	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

CHROMIUM NICKEL STEEL

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50

STRAIGHT CHROMIUM STEEL

403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F.	19.50	22.50	29.50	18.75	24.50
440A.	24.00	28.50	33.50	23.75	36.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00

STAINLESS CLAD STEEL (20%)

304	§§18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price.

Seconds, maximum prices: flat-rolled rejects 75% of prime prices, wasters 75%, waste-wasters 65% except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%

Carriage and Machine

½ x 6 and smaller ..... 65½ off
Do., ⅛ and ⅜ x 6-in. and shorter ..... 63½ off
Do., ¾ to 1 x 6-in. and shorter ..... 61 off
1⅛ and larger, all lengths ..... 59 off
All diameters, over 6-in. long ..... 59 off
Tire bolts ..... 50 off
Step bolts ..... 56 off
Plow bolts ..... 65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex	U.S.S.	S.A.E.
⅛-inch and less	62	64
⅛-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	

Hexagon Cap Screws

Upset 1-in., smaller ..... 64 off
Milled 1-in., smaller ..... 60 off

Square Head Set Screws

Upset, 1-in., smaller ..... 71 off
Headless, ¼-in., larger ..... 60 off
No. 10, smaller ..... 70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural 3.75c
⅛-inch and under ..... 65-5 off
Wrought, Washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l. ..... $2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*7.50
Connellsville, foundry	8.00- 8.50
New River, foundry	9.00- 9.25
Wise county, foundry	7.75- 8.25
Wise county, furnace	7.25- 7.75
By-Product Foundry	
Kearney, N. J., ovens	13.05
Chicago, outside delivered	13.00
Chicago, delivered	13.75
Terre Haute, delivered	13.50
Milwaukee, ovens	13.75
New England, delivered	14.65
St. Louis, delivered	†13.75
Birmingham, delivered	10.90
Indianapolis, delivered	13.50
Cincinnati, delivered	13.25
Cleveland, delivered	13.20
Buffalo, delivered	13.40
Detroit, delivered	13.75
Philadelphia, delivered	13.28

*Operators of hand-drawn ovens using trucked coal may charge $8.00, effective May 26, 1945.
†14.25 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do., tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold-rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series	NE hot bars 9400 series
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[14]	4.244[11]	4.715	6.012[23]	6.012[23]
New York	3.853[1]	3.758[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[12]	4.613[14]	4.203[21]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[12]	4.613[14]	4.203[21]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[1]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[15]	4.872[35]	4.172[21]	4.772	5.816[23]	5.860[23]
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[35]	4.152[21]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.196[17]	4.841[20]	4.141[21]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[34]	4.265[21]	.....	.....	.....
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.63[1]	5.26[1]	3.35[1]	3.819[1]	3.819[1]	4.75[18]	4.40[10]	3.85[21]	4.669	5.60[23]	5.75[23]
Buffalo (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.81[1]	3.50[1]	4.65[15]	4.30[10]	3.75[21]	4.35	5.60[23]	5.75[23]
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[12]	4.40[34]	3.85[21]	.....	.....	.....
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[12]	4.30[34]	3.75[21]	.....	.....	.....
Cleveland (city)	3.35[1]	3.588[1]	3.40[1]	5.188[1]	3.35[1]	3.60[1]	3.60[1]	4.877[12]	4.40[34]	3.85[21]	4.45[21]	5.60[23]	5.65[23]
Cleveland (country)	3.25[1]	.....	3.30[1]	.....	3.25[1]	3.50[1]	3.50[1]	.....	4.30[34]	3.75[21]	4.35[21]	.....	.....
Detroit	3.450[1]	3.661[1]	3.609[1]	5.281[1]	3.450[1]	3.700[1]	3.700[1]	5.000[12]	4.500[24]	3.900[21]	4.659	5.93[23]	5.93[23]
Omaha (city, delivered)	4.115[1]	4.165[1]	4.165[1]	5.765[1]	3.865[1]	4.215[1]	4.215[1]	5.608[19]	5.443[36]	4.543[12]	.....	.....	.....
Omaha (country, base)	4.015[1]	4.065[1]	4.065[1]	5.665[1]	3.765[1]	4.115[1]	4.115[1]	5.508[19]	.....	.....	.....	.....	.....
Cincinnati	3.611[1]	3.691[1]	3.661[1]	5.291[1]	3.425[1]	3.675[1]	3.675[1]	4.825[12]	4.475[34]	4.111[21]	4.711	6.10	6.20
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.40[12]	.....	.....	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.65[10]	.....	.....	.....	.....	.....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	5.231[15]	4.20[24]	3.85[21]	4.65	5.75[23]	5.85[23]
Milwaukee	3.637[1]	3.687[1]	3.687[1]	5.287[1]	3.387[1]	3.737[1]	3.737[1]	5.272[15]	4.337[24]	3.987[21]	4.787	5.987[23]	6.087[23]
Indianapolis	3.58[1]	3.63[1]	3.63[1]	5.23[1]	3.518[1]	3.768[1]	3.768[1]	4.918[15]	4.568[24]	4.08[21]	4.78	6.08[23]	6.18[23]
St. Paul	3.76[2]	3.81[2]	3.81[2]	5.41[2]	3.51[2]	3.86[2]	3.86[2]	5.257[15]	4.46[24]	4.461[21]	5.102	6.09[23]	6.19[23]
St. Louis	3.647[1]	3.697[1]	3.697[1]	5.297[1]	3.397[1]	3.747[1]	3.747[1]	5.172[15]	4.347[24]	4.131[21]	4.931	6.131[23]	6.281[23]
Memphis, Tenn.	4.015[5]	4.065[5]	4.065[5]	5.78[5]	3.965[5]	4.215[5]	4.215[5]	5.265[15]	4.78[24]	4.43[21]	.....	.....	.....
Birmingham	3.50[1]	3.55[1]	3.55[1]	5.903[1]	3.45[1]	3.70[1]	3.70[1]	4.75[15]	4.852[24]	4.64	5.215	.....	.....
New Orleans (city)	4.10[4]	3.96[4]	3.90[4]	5.85[4]	4.058[4]	4.20[4]	4.20[4]	5.25[26]	5.079[10]	4.70[21]	5.429	.....	.....
Houston, Tex.	3.75[3]	4.25[3]	4.25[3]	5.50[3]	3.763[3]	4.313[3]	4.313[3]	5.313[30]	4.10[10]	3.75[21]	.....	.....	.....
Los Angeles	4.40[4]	4.65[4]	4.95[4]	7.20[4]	5.00[4]	4.95[4]	6.75[4]	6.00[12]	7.20[6]	5.683[22]	5.613	5.85[23]	5.95[23]
San Francisco	4.15[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	5.75[7]	6.35[15]	7.30[15]	5.433[22]	7.333	8.304[22]	8.404[22]
Portland, Oreg.	4.45[27]	4.45[27]	4.75[27]	6.50[27]	4.65[27]	4.75[27]	6.30[27]	5.75[15]	6.60[15]	5.633[15]	.....	.....	.....
Tacoma	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[15]	7.60[15]	5.883[21]	.....	.....	8.00[23]
Seattle	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[15]	7.05[15]	5.883[21]	.....	.....	8.00[23]

*Basing point cities with quotations representing mill prices, plus warehouse spread.

NOTE—All prices fixed py Office of Price Administration in Amendments Nos. 10 to 33 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]—300 to 4999 pounds.

Ores

Lake Superior Iron Ore

Gross ton. 51½% (Natural) Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	13.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.

(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	$41.00
48% 3:1	43.50
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80

Brazilian—nominal

44% 2.5:1 lump	33.65
48% 3:1 lump	43.50

Rhodesian

45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50

Domestic (seller's nearest rail)

48% 3:1	52.80

less $7 freight allowance

Manganese Ore

Sales prices of Metals Reservev Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85.0c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91.0c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 248, effective as of May 15. Price at basing points which are also points of discharge of imported manganese ore is f.o.b. cars, shipside, at dock most favorable to the buyer.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Chemical Composition Limits, Per Cent — Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Electric furnace Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per GT
NE 8612	.10-.15	.70-.90	.20-.35	.40-.60	.40-.70	.15-.25	$0.65	$13.00	$1.15	$23.00
NE 8720	.18-.23	.70-.90	.20-.35	.40-.60	.40-.70	.20-.30	.70	14.00	1.20	24.00
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.30	26.00
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.15	23.00
NE 9830	.28-.33	.70-.90	.20-.35	.70-.90	.85-1.15	.20-.30	1.30	26.00	1.80	36.00
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 9, effective June 10, 1941, amended Feb. 14, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$26.00	$25.50	$27.00	$26.50
Newark, N. J., del.	27.53	27.03	28.53	28.03
Brooklyn, N. Y., del.	28.50	.....	.....	29.00
Birdsboro, Pa., base	26.00	25.50	27.00	26.50
Birmingham, base	‡21.38	‡20.00	26.00	.....
Baltimore, del.	26.61	.....	.....	.....
Boston, del.	26.12	.....	.....	.....
Chicago, del.	25.22	.....	.....	.....
Cincinnati, del.	25.06	23.68	.....	.....
Cleveland, del.	25.12	24.24	.....	.....
Newark, N. J., del.	27.15	.....	.....	.....
Philadelphia, del.	26.46	25.96	.....	.....
St. Louis, del.	25.12	24.24	.....	.....
Buffalo, base	25.00	24.00	26.00	25.50
Boston, del.	26.50	26.00	27.50	27.00
Rochester, del.	26.53	.....	27.53	27.03
Syracuse, del.	27.08	.....	28.08	27.58
Chicago, base	25.00	24.50	25.50	25.00
Milwaukee, del.	26.10	25.60	26.60	26.10
Muskegon, Mich., del.	28.19	.....	.....	28.19
Cleveland, base	25.00	24.50	25.50	25.00
Akron, Canton, O., del.	26.39	25.89	26.89	26.39
Detroit, base	25.00	24.50	25.50	25.00
Saginaw, Mich., del.	27.31	26.81	27.81	27.31
Duluth, base	25.50	25.00	26.00	25.50
St. Paul, del.	27.63	27.13	28.13	27.63
Erie, Pa., base	25.00	24.50	26.00	25.50
Everett, Mass., base	26.00	25.50	27.00	26.50
Boston, del.	26.50	26.00	27.50	27.00
Granite City, Ill., base	25.00	24.50	25.50	25.00
St. Louis, del.	25.50	25.00	.....	25.50
Hamilton, O., base	25.00	24.50	.....	25.00
Cincinnati, del.	25.44	25.61	.....	26.11
Neville Island, Pa., base	25.00	24.50	25.50	25.00
‡Pittsburgh, del. No. & So. sides	25.69	25.19	26.19	25.69
Provo, Utah, base	23.00	22.50	.....	.....
Sharpsville, Pa., base	25.00	24.50	25.50	25.00
Sparrows Point, base	26.00	25.50	.....	.....
Baltimore, del.	26.99	.....	.....	.....
Steelton, Pa., base	.....	25.50	.....	26.50
Swedeland, Pa., base	26.00	25.50	27.00	26.50
Philadelphia, del.	26.84	26.34	.....	27.34
Toledo, O., base	25.00	24.50	25.50	25.00
Youngstown, O., base	25.00	24.50	25.50	25.00
Mansfield, O., del.	26.94	26.44	27.44	26.94

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. †For phosphorus 0.70% or over deduct 38 cents. ‡For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., $2 per ton; for each additional 0.25% nickel, $1 per ton.

High Silicon, Silvery

6.00-6.50 per cent (base)		$30.50
6.51-7.00	$31.50	9.01- 9.50, 36.50
7.01-7.50	32.50	9.51-10.00, 37.50
7.51-8.00	33.50	10.01-10.50, 38.50
8.01-8.50	34.50	10.51-11.00, 39.50
8.51-9.00	35.50	11.01-11.50, 40.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Electric Furnace Ferrosilicon: Sil. 14.01 to 14.50%, $45.50; each additional .50% silicon up to and including 18% add $1; low impurities not exceeding 0.05 Phos., 0.40 Sulphur, 1.0% Carbon, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn. $34.00
Chicago, del. 37.34

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn. $28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. 33.00

Gray Forge

Neville Island, Pa. $24.50
Valley base 24.50

Low Phosphorus

Basing points: Birdsboro, Pa., $30.50; Steelton, Pa., and Buffalo, N. Y., 30.50 base; 31.74, del., Philadelphia. Intermediate phos., Central Furnace, Cleveland, $27.50

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differential: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky. $68.50

First Quality

Pa., Ill., Md., Mo., Ky.	54.40
Alabama, Georgia	54.40
New Jersey	59.35
Ohio	47.70

Second Quality

Pa., Ill., Md., Mo., Ky.	49.35
Alabama, Georgia	40.30
New Jersey	52.00
Ohio	38.15

Malleable Bung Brick

All bases 63.45

Silica Brick

Pennsylvania	54.40
Joliet, E. Chicago	62.45
Birmingham, Ala.	54.40

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	32.90
Wire cut	30.80

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.60
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net tons, carloads CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. After Aug. 29 base price any grade $30.) war chemicals.

Ferroalloy Prices

Ferromanganese (standard) 78-82% c.l. gross ton, duty paid, $135; add $6 for packed c.l., $10 for ton, $13.50 less-ton, f.o.b. cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer; Rockdale or Rockwood, Tenn.; where Tennessee Products Co. is seller; Birmingham, Ala., where Sloss-Sheffield Steel & Iron Co. is seller; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%; delivered Pittsburgh. $140.33.

Ferromanganese (Low and Medium Carbon); per lb. contained manganese; eastern zone, low carbon, bulk, c.l., 23c; 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c; 2000 lb. to c.l., 24.40c; medium 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.75c and 17.20c; f.o.b. shipping point, freight allowed.

Spiegeleisen: 19-21% carlots per gross ton, Palmerton, Pa., $36; 16-19%, $35.

Electrolytic Manganese: 99.9% plus, less ton lots, per lb. 37.6 cents.

Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, per lb. contained chromium bulk, c.l., 79.50c, 2000 lb. to c.l. 80c; central, 81c and 82.50c; western 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, R.R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l., 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome; Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l., max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65 for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

Special Foundry ferrochrome: (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome, high carbon: (Chrom. 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil. 4-6%, mang. 4-6% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium, 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

Silcaz Alloy: (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed; 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

Silvaz Alloy: (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir. 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern, freight allowed; 58.50c 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up ¼c.

CMSZ Alloy 4: (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract, carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c.

CMSZ Alloy 5: (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%, car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western, spot up .25c.

Ferro-Boron: (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% max.) per lb. of alloy contract ton lots, $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Manganese-Boron: (Mang. 75% approx., boron 15-20%, iron 5% max., sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract, ton lots, $1.89, less, $2.01, eastern, freight allowed; $1.903 and $2.028 central, $1.935 and $2.055 western, spot up 5c.

Nickel-Boron: (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract, 5 tons or more, $1.90, 1 ton to 5 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Chromium-Copper: (Chrom. 8-11%, cu. 88-90%, iron 1% max. sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide approx. 2%, or Red Cake; Vanadium oxide 85% approx., sodium oxide, approx. 2% and water approx.

2.5%) Contract, any quantity, $1.10 eastern, freight allowed per pound vanadium oxide contained; contract carlots, $1.105, less carlots, $1.108, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

Calcium metal; east: Contract ton lots or more $1.80, less, $2.30, eastern zone, freight allowed, per pound of metal; $1.809 and $2.309 Central, $1.849 and $2.349, western; spot up 5c.

Calcium-Manganese-Silicon: (Cal. 16-20% mang. 14-18% and sil. 53-59%), per lb. of alloy. Contract, carlots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c.

Calcium-Silicon: (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, carlot, lump 18.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up .25c.

Briquets, Ferromanganese: (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.) per lb. of briquets. Contract, carlots, bulk .0605c, packed .063c, tons .0655c, less .068c eastern freight allowed; .063c, .0655c, .0755c and .078c, central; .068, .0855c, .0855c and .088c, western; spot up .25c.

Briquets: Ferrochrome, containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l., and .2c for 2000 lb. to c.l.; **silicomanganese,** eastern, containing exactly 2 lb. manganese and approx. ½ lb. silicon, bulk, c.l., 5.80c, 2000 lbs. to c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; western, add .5c for c.l., and 2c for 2000 lb. to c.l.; **ferrosilicon,** eastern, approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l., and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75% per lb. contained molybdenum f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Silicon Metal: Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c, 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon.

Manganese Metal: (96 to 98% manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 36c 2000 lb. to c.l., 38c, central, 36.25c, and 39c; western 36.55c and 41.05c; 95 to 97% manganese, max. 2.50% iron, eastern, bulk, c.l., 34c; 2000 to c.l., 35c; central 34.25c and 36c; western, 34.55c and 36.05c; f.o.b. shipping point, freight allowed.

Ferrotungsten: Spot, carlots, per lb. contained tungsten, $1.90; freight allowed as far west as St. Louis.

Tungsten Metal Powder: spot, not less than 97 per cent, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40 eastern. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20% contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Carbortam: Boron 0.90 to 1.15%, net ton to carload, 8c lb. f.o.b. Suspension Bridge, N. Y., frt. allowed same as high-carbon ferrotitanium.

Bortam: Boron 1.5-1.9%, ton lots 45c lb., less ton lots 50c lb.

Ferrovanadium: 35-55%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Zirconium Alloys: 12-15%, per lb. of alloy, eastern contract, carlots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot ¼c per ton higher.

Zirconium Alloy: 35-40%, Eastern, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼ cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis f.o.b. Niagara Falls, N. Y., per lb. 5.75c; ton lots 6.50c. Spot ½ cent higher.

Simanal: (Approx. 20% each Si., Mn., Al.) Contract, frt. all. not over St. Louis rate, per lb. alloy; carlots 8c; ton lots 8.75c; less ton lots 9.25c.

Borosil: 3 to 4% boron, 40 to 45% Si., $6.25 lb. cont. Bo., f.o.b. Philo, O., freight not exceeding St. Louis rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page 150 of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.75
No. 2 Heavy Melt. Steel	18.75
No. 2 Bundles	18.75
No. 3 Bundles	16.75
Mixed Borings, Turnings	13.75
Machine Shop Turnings	13.75
Billet, Forge Crops	23.75
Bar Crops, Plate Scrap	21.25
Cast Steel	21.25
Punchings	21.25
Elec. Furnace Bundles	19.75
Heavy Turnings	18.25

Cast Grades

(F.o.b. Shipping Point)

Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:

(Dealers' buying prices.)

No. 1 Heavy Melt. Steel	$15.33
No. 2 Heavy Melt. Steel	15.33
No. 2 Hyd. Bundles	15.33
No. 3 Hyd. Bundles	13.33
Chemical Borings	14.33
Machine Turnings	10.33
Mixed Borings, Turnings	10.33
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstrip Motor Blocks	17.50
Stove Plate	19.00

CLEVELAND:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	14.50
Short Shovel Turnings	16.50
Mixed Borings, Turnings	14.50
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	13.50-14.00
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec. Furnace Bundles	20.50

BOSTON:

(F.o.b. shipping points)

No. 1 Heavy Melt. Steel	14.06
No. 2 Heavy Melt. Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	14.06
No. 1 Busheling	14.06
Machine Shop Turnings	9.06
Mixed Borings, Turnings	9.06
Short Shovel Turnings	11.06
Chemical Borings	13.81
Low Phos. Clippings	16.56
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

Boston Differential 99 cents higher, steel-making grades; Providence $1.09 higher.

PITTSBURGH:

(Delivered consumer's plant)

Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp Bundles	20.00
Short Shovel Turnings	17.00
Mach. Shop Turnings	15.00
Mixed Borings, Turnings	15.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	22.00

VALLEY:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt.	$21.00
No. 1 Heavy Melt Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Cast Iron Borings	16.00
Machine Shop Turnings	15.00
Low Phos. Plate	22.50

MANSFIELD, O.:

(Delivered consumer's plant)

Machine Shop Turnings	15.00

BIRMINGHAM:

(Delivered consumer's plant)

Billet Forge Crops	$22.00
Structural, Plate Scrap	19.00
Scrap Rails Random	18.50
Rerolling Rails	20.50
Angle Splice Bars	20.50
Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.00
Long Turnings	8.50- 9.00
Cast Iron Borings	8.50- 9.00
Iron Car Wheels	16.50-17.00

CHICAGO:

(Delivered consumer's plant)

No. 1 R.R. Hvy. Melt	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dlr. Bundles	18.75
Baled Mach. Shop Turn.	18.75
No. 3 Galv. Bundles	16.75
Machine Turnings	13.75
Mix. Borings, Sht. Turn.	13.75
Short Shovel Turnings	15.75
Cast Iron Borings	14.75
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00

(Cast grades f.o.b. shipping point, railroad grades f.o.b. tracks)

BUFFALO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	14.25
Short Shovel Turnings	16.25
Mixed Borings, Turn.	14.25
Cast Iron Borings	15.25
Low Phos.	21.75

DETROIT:

(Dealers' buying prices)

Heavy Melting Steel	$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	12.32
Short Shovel Turnings	14.32
Cast Iron Borings	13.32
Low Phos. Plate	19.82
No. 1 Cast	20.00
Heavy Breakable Cast	16.50

ST. LOUIS:

(Delivered consumer's plant)

Heavy Melting	$17.50
No. 1 Locomotive Tires	20.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	12.22
Shoveling Turnings	14.22
Rerolling Rails	21.00
Steel Car Axles	21.50-22.00
Steel Rails, 3 ft.	21.50
Steel Angle Bars	21.00
Cast Iron Wheels	20.00
No. 1 Machinery Cast	20.00
Railroad Malleable	22.00
Breakable Cast	16.50
Stove Plate	19.00
Grate Bars	15.25
Brake Shoes	15.25
(Cast grades f.o.b. shipping point)	
Stove Plate	18.00

CINCINNATI:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.50
No. 2 Heavy Melt. Steel	18.50
No. 1 Comp. Bundles	18.50
No. 2 Comp. Bundles	18.50
Machine Turnings	9.50-10.00
Shoveling Turnings	11.50-12.00
Cast Iron Borings	11.00-11.50
Mixed Borings, Turnings	10.50-11.00
No. 1 Cupola Cast	20.00
Breakable Cast	16.50
Low Phosphorus	21.00-21.50
Scrap Rails	20.50-21.00
Stove Plate	16.00-16.50

LOS ANGELES:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$14.00
No. 2 Heavy Melt. Steel	13.00
No. 1, 2 Deal. Bundles	12.00
Machine Turnings	4.50
Mixed Borings Turnings	4.00
No. 1 Cast	20.00

SAN FRANCISCO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$15.50
No. 2 Heavy Melt. Steel	14.50
No. 1 Busheling	15.50
No. 1, No. 2 Bundles	13.50
No. 3 Bundles	9.00
Machine Turnings	6.90
Billet, Forge Crops	15.50
Bar Crops, Plate	15.50
Cast Steel	15.50
Cut Structural, Plate, 1", under	18.00
Alloy-free Turnings	7.50
Tin Can Bundles	14.50
No. 2 Steel Wheels	16.00
Iron, Steel Axles	23.00
No. 2 Cast Steel	15.00
Uncut Frogs, Switches	16.00
Scrap Rails	16.00
Locomotive Tires	16.00

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½c, refinery; dealers may add ¾c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, chemical, 6.40c, corroding, 6.45c, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester, Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less through 2000 lbs.

Secondary Aluminum: All grades 12.50c per lb. except as follows: Low grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (92½% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 (95-97½%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.50c to 8.75c, Grade 4 (85-90%) 7.50c to 8.00c; any other ingot containing over 1% iron, except PM 754 and hardness, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.), 20.50c lb., add 1c for special shapes and sizes. Alloy ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing screening, barrelling, handling, and other preparation charges, 23.50c. Prices for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, f.o.b. plant, any quantity; carload freight allowed all other alloys for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots, Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239. 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American bulk carlots f.o.b. Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224 lb.; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: OPA ceiling prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz., $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193. Open market, spot, New York, nominal for 50 to 100 flasks; $158 to $163 in smaller quantities.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $17 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $1.50 lb. for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

Indium: 99.9%, $7.50 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 44.75c per ounce.

Platinum: $35 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.46c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 26.50c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c; Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlot 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s, flat mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%. Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2% 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cyanide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled, depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

Tin Crystals: 400 lb. bbls. 39.00c f.o.b. Grasselli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c f.o.b. Niagara Falls.

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add ⅝c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

Scrap Metals

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.875
Commercial bronze			
90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz metal	8.000	7.750	7.250
Nickel Sil, 5%	9.250	9.000	4.625
Phos. br., A, B, 5%	11.000	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	3.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 7.50c; Muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Prices f.o.b. point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb., 11, 14, etc., 3 to 3.50c lb. All other high-grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb. borings and turnings one cent less than segregated.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

Zinc Scrap: New clippings 7.25c, old zinc 5.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c, add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.

The Keystone in the Production Program

R & R Hydrogen Reduced TUNGSTEN Metal Powder

Demand for Hydrogen Reduced TUNGSTEN METAL POWDER is constantly increasing. The higher purity standard and particle size control achieved in the production of R & R TUNGSTEN METAL POWDER has greatly accelerated this demand, and brought the R & R Brand into prominence in the industrial field, and other spheres of service.

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In the production of carbide cores for shells, our Hydrogen Reduced Tungsten Metal Powder meets every requirement, and has become an essential component in the manufacture of this ordnance.

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We are today, the supplier of TUNGSTEN METAL POWDER for leading carbide cutting tool manufacturers. Our XXX—A Hydrogen Reduced Tungsten Metal Powder, purity 99.9+ per cent with controlled particle size of

90% below 1 micron
8% under 90, 1 to 3 microns
2% 3 to 5 microns,

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R&R TUNGSTEN QUALITY POWDERS

REDUCTION and REFINING COMPANY
96 Roanoke Avenue, NEWARK, N. J.

Sheets, Strip . . .

Sheet & Strip Prices, Page 164

While sheet cancellations now exceed inquiry many producers believe this will be reversed within a short time and buying will be greater than total of orders canceled. Producers are not yet able to promise delivery on new business, the task of reforming schedules being too great to be completed yet. However, deliveries are sure to be much earlier than were possible a fortnight ago. Even on unrated orders placed weeks ago time of delivery is uncertain at present. In some areas shortage of workers is delaying production and shipment.

New York — While sheet cancellations are heavy and well overbalance inquiry, there still is considerable new demand. Some leading sellers believe that within another couple of weeks the volume of new inquiry will overshadow cancellations.

Although demand is principally for hot and cold-rolled sheets, strong inquiry prevails for silicon sheets, and it appears likely as time goes on there will be a continued marked scarcity in this specialty, particularly because of power transformer and radio requirements. There should be few disruptions because of cancellations, as civilian requirements will follow closely those of the war.

Meanwhile, producers of silicon sheets are disposed to concentrate more on production of high silicon tonnage, as it is more profitable, for one reason. Sellers of stainless steel, another specialty, see no great decline in demand for that material. There may be a temporary lag, but some sellers believe that within at least another two or three months buying of stainless will be heavier than it was during the closing months of the war. The outlook for long ternes is not too promising at present.

Due to the heavy release of cancellations mills do not know where they stand at the moment on deliveries; consequently they can make no promises. This not only applies to new business but to unrated orders received over weeks and months past. Incidentally, many of the latter unrated orders are ambiguous in their terms. For instance, some specified delivery 30 days after V-J Day. The question arises does this actually mean 30 days after official V-J Day or 30 days after the end of hostilities; and where the tonnages are particularly large, as in the case of some automotive specifications, the question arises as to whether the consumers will be ready to take delivery when there is clarification as to what is meant by the 30 days stipulation, whether they will be ready to accept delivery or will want the mills to hold back.

Some sellers are already taking up these matters with customers, but the tendency among most is to wait until they know more clearly where they stand with regard to cancellations and cutbacks.

Chicago — Surprising as it may seem, end of the war resulted in only moderate reduction of sheet demand. This is attributed to the tremendous order load which sheet makers have been carrying and the fact that only a small portion of the product has been for direct war use. A substantial part of the business on books was rated tonnage which was

not appreciably affected by cancellations. Illustrative of this is the case of a local mill which received no cancellations of cold-rolled or galvanized sheets for August and September, and lost only 5000 tons of hot-rolled pickled and 2400 tons of hot-rolled. Virtually all rated business remains in schedules. However, sheet mills with orders for sheets for Navy pontoons, landing mat and cartridge cases did suffer cancellations.

Cincinnati — Cancellations are still being received by sheet mills although it is estimated 90 per cent of these have already been filed. Rolling schedules are being maintained at 100 per cent despite frequent adjustments. Books are filled through September and by that time reconversion on domestic goods may have reached the point where some type of rationing, to distribute an inadequate tonnage, may be necessary, according to some views. Mills show anxiety regarding their supplies of lead and tin.

Boston — As rescheduling nears completion, openings are apparent for delivery of substantially more open end narrow cold strip tonnage in fourth quarter. Buyers are seeking definite promises as to shipment and inquiry for additional reconversion tonnage is heavier. Substantial volume of unrated orders has been moved forward, filling cancellation gaps, but backlogs still include rated orders under CMP for shipment this quarter and beyond. These include producers of B products with allotment symbols in which end-use is uncertain, tonnage for bearing spacers, certain types of chain and other products not directly tagged for war equipment. Some of this tonnage is being canceled and some is not, although in numerous instances there may be specification changes if lead time permits. Shifts in specifications, grades and sizes, are expected over the next few weeks to fit demand for civilian products. These revisions will filter down into hot strip schedules and in alloys may present difficulty. Demand for sheets is heavier, notably specialties, electrical, enameling and stainless. Sheet cancellations are not staggering in this area as war requirements have tended lower for some time. Scattered sheet orders are under priority assistance, but most are not. One of the few direct military contracts expected to stick, for a time on reduced scale, is for bug bombs. Extent of duplication in orders for sheets and strip is still clouded until deliveries are more fixed and definite.

St. Louis — Cancellations of military sheet orders have not been half what had been expected and desired by producers, but will advance deliveries about a month. Labor shortage is still severe, with no indication of improvement. Three furnaces are down at one mill for lack of finishers and scarcity of loaders delays shipment of some finished sheets. Mills need double present cancellations to put them on a current basis.

Birmingham — Local mills report virtually no effect on sheets from cutbacks to date. Civilian demand, especially for roofing sheets, is large and will require considerable effort to catch up on backlogs now in hand.

Pittsburgh — No definite delivery schedule on sheets and strip can be determined at this time, as cancellations continue heavy. In a few instances some

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customers have asked mills to hold up shipments because they are unprepared to handle the steel. Another uncertain factor is to what extent many customers are expected to hold a substantial portion of their war contract tonnage to maintain preferred positions, particularly in view of scheduled open ending of CMP priorities, except for the new "MM" and "AA" ratings, at the close of this quarter. A close check on consumer inventories is expected to be carried out by WPB in the interest of smaller manufacturers. With the possible exception of galvanized sheets, strip and sheet production through the remainder of this year probably will meet all reconversion requirements.

Philadelphia — Sheet cancellations have been fairly heavy and one district sales office handling a diversity of products reported that 40 per cent of all cancellations during the first postwar week was in sheets, with 25 per cent in bars. In general cold-rolled sheets have been much less affected than hot-rolled and following some Army and Navy cancellations a couple of weeks ago galvanized sheets have not been greatly affected. One district seller of flat-rolled products asserts that cuts in hot strip have been heaviest of all with him. Some sheet consumers who have canceled tonnage since the end of the war already have entered new orders and most sellers report business is picking up and when mills are in position to make definite delivery promises buying should increase materially.

Steel Bars . . .

Bar Prices, Page 164

Uncertainty rules among bar producers, who have not had sufficient time to adjust schedules after the mass of cancellations following end of the war. Much civilian business remains on books and is pressing for delivery, awaiting clarification of mill position on schedules. Numerous industries which are large users of bars have plenty of business on books which will furnish heavy bar demand for some time.

New York — Bar cancellations are heavy and producers generally do not know where they stand on deliveries. In view of the large cancellations in aircraft work in this district the cutbacks in alloy bars have been particularly marked. There has been a tapering in demand for some weeks past as a result of curtailments in aircraft production, but since the end of the war producers of alloys have been impressed with the volume of aircraft work that was still going on up to that time. It appears that for some time to come a consumer of alloy bars will be able to obtain most anything he wants in 30 to 45 days.

Carbon bars should also be in easy demand here except in the smaller sizes. In the latter there should soon be heavy requirements for road building, requirements taking sizes from ⅜ to ⅝-inch, and also as time goes on substantial needs for general building construction, for window sash sections, stairs, fire escapes and so forth. There should also be active demand for small bars from electrical equipment manufacturers, from bolt and nut makers, and makers of small hand tools.

St. Louis — Widespread cancellations have left the bar situation here badly confused and producers are unable to determine if delivery schedules can be advanced materially. Civilian order backlogs still are heavy and producers believe further orders will come out immediately, in time to prevent serious labor layoffs. One mill has taken advantage of the period of uncertainty to bank half its furnaces for repair. Pressure for civilian bars has increased greatly. Deliveries on merchant bars now are late October and early November.

Pittsburgh — Exact status of backlogs for carbon and alloy merchant steel bars is unknown, due to confusion arising out of delay in receipt of cancellations on substantial tonnages involved in a number of war programs. However, when this situation is clarified, most sellers believe October delivery can be promised on new orders for most sizes of carbon steel bars, while alloys will be available for September shipment. Cold rollers and forge shops report heavy order cancellations, but demand from automotive, agricultural and railroad equipment industries is expected to bolster operations considerably during the early reconversion period. Considerable export tonnage also is scheduled to be rolled next quarter. Volume of MM and AAA tonnage is expected to be relatively small for fourth quarter and consequently should not interfere with output for miscellaneous civilian goods.

Boston — Bar tonnage has about plumbed bottom and should gain shortly for reconversion at a level well under the war peak. Cancellations by some distributors of larger size carbon bars

follow sharply reduced war needs, but aircraft decline in demand is most pronounced in alloys. Forge shops are readjusting specifications to meet automotive demand in some cases, also heavy equipment and machinery builders. Bolt and nut backlogs are smaller. Normally bulk of bar tonnage in this area is distributed by warehouses and the trend toward a return is about complete.

Chicago—Much bar business was not subject to cancellation with the war's end and backlogs continue heavy. First quarter still is the best that can be done on carbon bars, but alloys are available in September and October. Cancellations so far have not been as heavy as expected, thus adjusting production schedules was not particularly complicated.

Philadelphia — Bar inquiry is picking up but until producers are able to analyze the extent of cancellations and know what they can offer in delivery firm orders will be rather limited. Most sellers believe, however, they will have a fairly good idea as to where they stand within a few days. At the moment it appears that a wide range of both hot and cold-drawn carbon bars will be available for October shipment. Reinforcing bar demand is starting to expand, although virtually all inquiries so far are well under 100 tons. Public road work is not expected to reach heavy volume before early next year, but some jobs are coming out now.

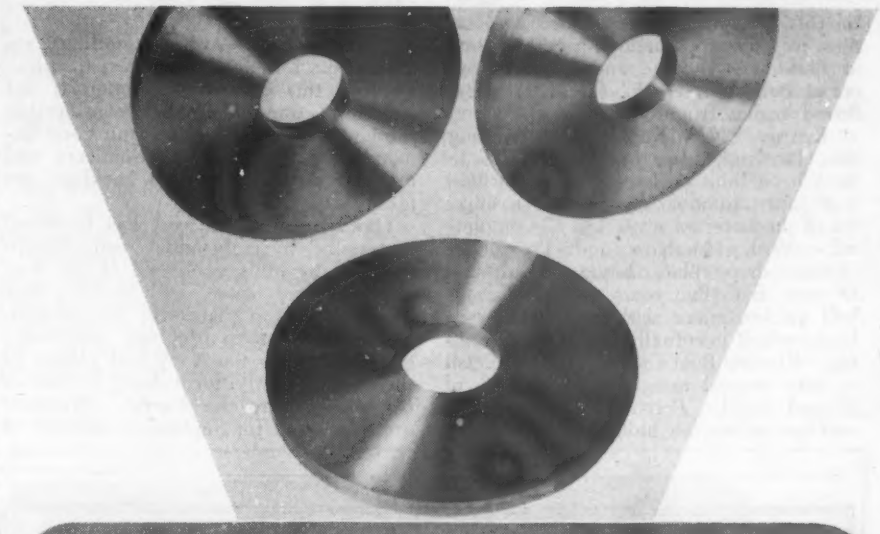
Steel Plates . . .

Plate Prices, Page 165

Steel plates, to a considerable degree liquidated before the end of the war, suffered less than other major steel products from cancellations after that event. Conversion of sheet and strip mills from plates to their normal product had been practically completed in advance as shipbuilding and other needs declined. Demand for ship repair, railroad cars and other uses promise to provide fairly large tonnages for future months, though production will be far less than during war years.

Pittsburgh — Cutbacks in plate production schedules aggregate nearly 80 per cent of order backlogs prior to the Japanese capitulation. Requirements for ship repair work are likely to be substantial through the year, and railroad equipment needs and substantial export requirements should also be a bolstering factor. However, output of plates is expected to continue at relatively low levels for many months. Plate producers felt the effect of the war end much less than producers of other steel products, for reconversion of sheet and strip mills to their normal product was about 100 per cent completed and plate mill order backlogs were rapidly being scaled down. Plate production was hard hit the past ten days, the largest producer's mill being completely shut down until last Thursday following the two-day holiday.

Boston — With navy yards at Boston and Portsmouth, N. H., possibly excepted, shipbuilding cancellations cut deeply into remaining plate requirements, removing substantial tonnage from backlogs, mostly forward volume. Boston navy yard has eliminated one shift, but political pressure makes layoffs at this yard a major operation. How long this yard and its annex can justify a force of



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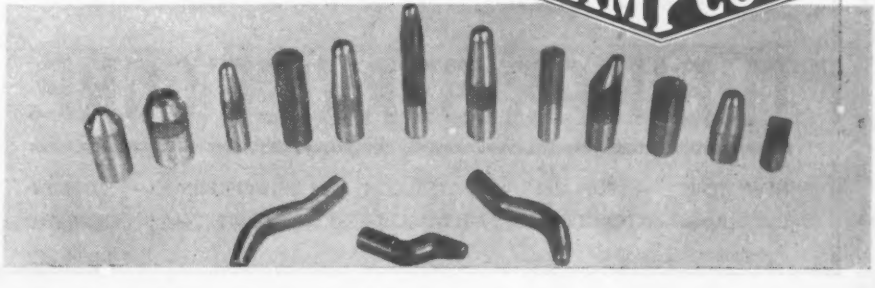

roughly 35,000 is uncertain. Cancellations in navy ships include seven cruisers at Bethlehem-Quincy, and four destroyers at Bath Iron Works, the latter transferred earlier from New Jersey, Federal at Kearny. New England Shipbuilding Co., Portland, Me., lost 12 tankers to have been built on lend-lease for Britain and four aircraft cargo (Zipper) ships. Six of the latter on ways will be completed. With Hingham and Providence closing shop, plate buying is slowest in more than five years and ship needs will slacken more with navy yard cutbacks which eventually will be forthcoming. Electric Boat Co. has work to finish to take several months with a force of around 4500. Portsmouth navy yard, another submarine builder, is employing approximately 15,000.

Birmingham — Although military requirements for plates are down to a low level in this district production is not suffering unduly, with considerable shipbuilding at Pascagoula and good demand from steel drum producers and other consumers. Other backlogs are fairly large.

Chicago — Plate load has benefited materially by substantial cancellations received by mills upon end of the war. Chief among these withdrawals were bomb steel, top plates for the substantial Navy pontoon program, and heavy tonnages which the Navy had placed on directive recently for rolling in August for shipment to the Pacific. Prospects are now good for September delivery of unrated plates rolled on both strip mills and plate mills.

Philadelphia — Plate producers, as a result of further recent cancellations, are offering September shipment, although most district mills are fairly well covered for that month. Recent curtailments in the ship program, affecting local yards, will not have great influence on plate rolling as much of the tonnage had been delivered. This is true with respect to requirements of the New York Shipbuilding Co., Camden, N. J., where latest cutbacks have reduced the order book to about $80 million.

Tin Plate . . .

Tin Plate Prices, Page 165

Pittsburgh — Limited tin supplies are not expected to hold up reconversion production programs for there are some effective substitutes, although they are more expensive, require more labor, and some are not as well suited for specific purposes. Reduction in military tin plate requirements for ration cans and tapering in lend-lease shipments should free some tin for civilian uses. However, unrestricted use of tin is believed many months away, at least until supplies of pig tin are available from Malaya and the Netherlands East Indies. Lifting of all restrictions on use of tin would increase annual consumption to around 100,000 tons, in contrast to present rate of 68,000 tons, which has resulted in an annual deficit of about 25,000 tons. A moderate reduction in fourth-quarter tin plate output is indicated, with shipments for the packing season largely over.

Minimum fourth quarter tin mill products requirements will approximate 840,000 tons, compared with 933,000 this quarter. Cutbacks in naval ship building program may reduce bronze requirements, which in turn will cut the demand for tin for new construction, but much bronze will still be needed for maintenance repairs and operating supplies.

Chicago — End of the war is not judged to have any major influence on demand and production of tin plate. Tin supply will continue short for some time and manpower may also serve as a retardant to output. Since most tin plate is going into food containers, no upsetting cancellations appear in prospect. A leading producer here reports only one cancellation since the war ended, this for a little over 200 tons of hot dip for September.

Tubular Goods . . .

Tubular Goods Prices, Page 165

Boston—Alloy tubing, notably chrome moly and aluminum, reflects heavy cancellations in aircraft, including propellers. Chemical Warfare Service contracts are all but eliminated in New England, only three remaining. When it came, curtailment in aircraft was sharper than expected, including Navy contracts, although New England firms were among the last to be severely cut. This filters down to scores of subcontractors, instrument and parts suppliers. Seamless requirements are reduced for mortar shells and in larger sizes, 14-inch for 500-pound bomb casings, substantial tonnage is canceled. The Maine plant, one

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f two, never got beyond pilot line production. Merchant steel pipe is not affected materially and demand is well maintained at a moderate level. Pipe tonnage lost, for ships, was largely potential.

Seattle — Cast iron pipe agencies report cancellations of government contracts for cast iron pipe but expect active business in the near future, as potential demand is of large proportions. H. C. Purcell, Seattle, has been awarded 350 tons for a project in Seattle. Everett, Wash., has called bids for Aug. 28 for 15,000 lineal feet of 12-inch, 7000 feet of 8-inch and 50,000 feet of 6-inch standard bell and spigot pipe, about 1000 tons. Snohomish, Wash., is considering bids on 100 tons of 6-inch pipe.

Structural Shapes . . .

Structural Shape Prices, Page 165

Pittsburgh — Cancellation of shell steel programs is expected to make possible greater output of structurals, and there is little likelihoood that projected expansion in construction activity will be held back by limited supply of standard structural items. All WPB recommendations for federal financing of projects are being reviewed in light of peacetime demands. Mills report good volume of tonnage on books for postwar construction, much of which will be moved up for early rollings. Considerable tonnage for bridges should bolster structural demand. When amount of raw steel for structural items is settled, it is likely that mill deliveries will be extended through Oct. 15.

Boston — Reconversion of major New England industries involves relatively little construction, but contracts account for approximately 1200 tons for brass, paper and electrical appliance plant extensions. A fillip to public works, notably bridge building, is due with easier materials supply. Among the earlier projects is a $2,600,000 high-level bridge over Anniston river, Gloucester, Mass. Only ship tonnage is materially affected by cutback cancellations in this area. Openings for October delivery are for the most part filled, smaller sizes especially.

Chicago — Large fabricators are set to go ahead immediately with peacetime fabricating operations, most of them having been freed in recent weeks of their remaining war contracts. Lack of steel had been a drawback. Smaller fabricators, on the other hand, have continued to hold a substantial volume of war contracts, most of which are now canceled. General feeling is that mills will once more be in a position to roll plain shapes for civilian use since the major demand has been for construction which has now pretty much gone out the window. One local shapemaker expects to be able to make delivery on some sizes in September.

Philadelphia — Shape schedules have not become fully clarified but it appears that some tonnage can be picked up in September, with still more in October. Until recently some mills were booked solidly into November. Cutbacks in the shell program have freed capacity on one wide-flange mill. With restrictions being lifted on building construction considerable tonnage should be available to fill gaps. Some builders expect further lifting of restrictions, indicated by the fact bids are being asked for Sept. 11 on 2000 tons of shapes for a speedway at Atlantic City. This is the largest recent inquiry. Inquiries are increasing but most are small.

Pig Iron . . .

Pig Iron Prices, Page 167

Pig iron probably is the least affected of all iron and steel industries by the end of the Pacific war. Foundries have a minimum of adjustment to peacetime production and heavy demand for castings has been pressing for some time. Production is continued at recent rates and all tonnage is being shipped, as foundry supplies are fairly low. Cancellations have been few but some deferments have been asked until the situation clears.

New York — There have been few cancellations of pig iron in this district, although there have been a fair number of deferments, pending clarification of the immediate outlook. With most iron here going to gray iron founders, local sellers continue optimistic. They are confident that as soon as more manpower is available the foundry melt will be greater than during the closing months of the war. Various foundries, even today claim that they could turn out 50 per cent more business if they had the manpower.

However, it is still too early to ap-

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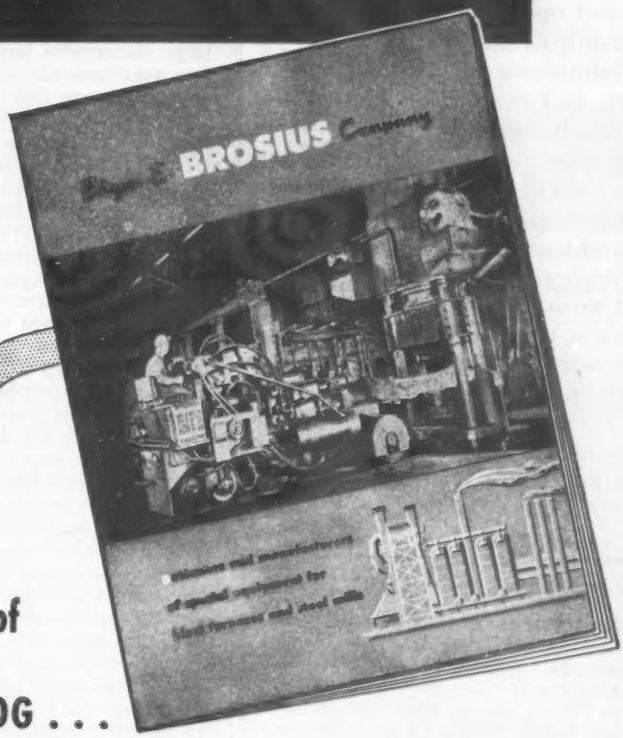

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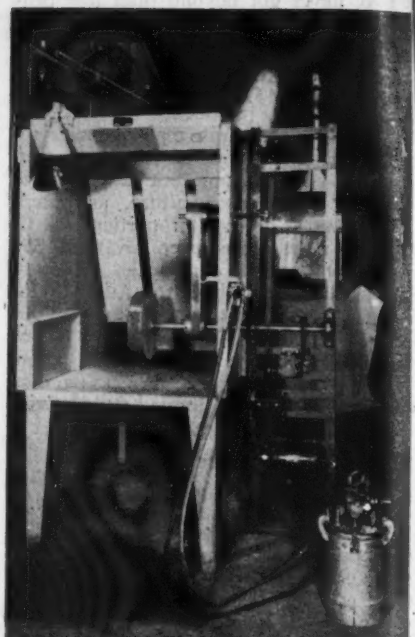
praise the volume of melt over the next few weeks. Some consumers have specified for September, but most probably will not before the last few days of this month. As a matter of fact, it is the policy of many foundries, even in less confusing times than these, to hold off until around the 25th of the preceding month in specifying ahead for the next month.

Further loosening of controls on manufacture of civilian products, as announced by the War Production Board during the past few days, has brightened the outlook in castings and in turn foundry pig iron requirements.

Pittsburgh — Little disruption to foundry activity followed end of the Pacific war, and there is a good indication that overall output probably will be increased with the probable easing in manpower. Most foundries had a large backlog of unrated tonnage, while rated tonnage for railroad, agricultural and heavy truck programs largely was left intact. Indicative of prospective demand for castings, a number of agricultural and automotive interests are shopping around in this district for prompt deliveries on substantial tonnages. A number of large consumers are placing one and two year non-cancellable contracts with outside sources, due to the fact that their foundry facilities are not large enough to meet estimated casting requirements. However, some merchant pig iron producers believe that most of the outside buying of steelmaking pig iron on the part of smaller steel plants will no longer be necessary now that the shell and other war programs have been canceled, while much of the inter-exchange of iron to meet urgent needs will also cease. Malleable gray iron castings, which have been holding up a good many war programs, are expected to be in greater supply, so that the automotive industry especially will not have much difficulty in obtaining requirements. Some improvement in both consumers' and producers' pig iron stocks is probable, but needed furnace repairs will limit this trend somewhat. Blast furnace and open-hearth operations were slow in resuming normal operations last week, following the complete shutdown for as long as four days in some instances after announcement of the cessation of hostilities. Time required to determine extent of war contract cancellations, scheduling of unrated tonnage and rearrangement of some finishing facilities account for the lag in returning to former production.

Cincinnati — Pig iron demand has failed to react to the surrender of Japan, either with an increase or decrease. Some district foundries are seeking more labor from plants released by military cutbacks, which was considered an indication of intention to expand output. Backlogs for civilian needs are heavy, and the machine tool industry is taking castings steadily. By-product coke supply is easier, partly on reduced requirements from the chemical industry.

Buffalo — Faced with no major reconversion problems, the foundry trade seems least affected of steel and iron industries. Most shops made an immediate shift to civilian production, except in some instances where specialties were involved. Producers see little change in overall movement of iron, the leading maker shipping its entire production.



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Foundry inventories are low in many instances. One leading seller is prorating shipments among customers. Fear is felt that a buying rush might leave some foundries short while others were well supplied. Bethlehem Steel Co. has shut down its J furnace at the Lackawanna plant, but denies it is to be scrapped.

Birmingham — Pig iron production remains on the basis of 18 active blast furnaces, with demand steady and indications for continued production at near capacity for some itme.

Chicago — Demand for pig iron is heavy. End of the war produced few cancellations, although strikes, and Victory holidays have brought holdups against coke shipments. The month-old strike of workers in 39 district foundries ended this week, as did two others of shorter duration. Another factor is the further loss in district blast furnaces. Only 30 of the 41 furnaces are producing at present. About 10 days ago Wisconsin Steel Co. banked a stack for coke shortage and it remains idle. Inland Steel Co. has not yet put back a furnace banked two weeks ago during a strike, and Carnegie-Illinois Steel Corp. has not returned to blast three furnaces banked for the Victory holiday.

Philadelphia — As a result of easing in basic demand there appears to be plenty of pig iron to meet all domestic requirements and also to provide some substantial exports as soon as shipping becomes available. Despite the easing in basic, however, there have been few cancellations, although a fair number of deferments. Sellers of foundry iron are optimistic over the outlook. With foundries soon able to get more labor sellers look for requirements to be actually heavier this fall at a number of foundries. Soil pipe foundries are already specifying more freely and an improvement is noted at stove plants, now that production restrictions have been lifted. Pressure pipe manufacturers expect a spurt soon. It is believed that when restrictions are lifted on inventories there will be a disposition among many consumers to increase stocks in anticipation of winter.

Scrap . . .

Scrap Prices, Page 168

Scrap shows little effect from return to peace and few cancellations have been offered, except on overdue contracts. Expectation of continued high rate of steel production and low scrap supply unite to maintain demand and price. Interruption of consumption while mills rearrange schedules has been an opportunity to build up depleted stocks in many cases. Supply is not excessive and all is being sold readily.

Pittsburgh — Scrap consumption has declined sharply in the past ten days, reflecting complete cessation of steel plant operations with announcement of the Japanese surrender, in some instances for as long as four days, while time required to determine extent of war contract cancellations, scheduling of unrated tonnage and rearrangement of some finishing facilities has slowed up the resumption to normal operations. However, the adjustment period should be over soon and a rebound in steel ingot operations to 70-80 per cent is indicated by early next month. No mill cancellation in current scrap commitments is reported, although overdue orders have been can-

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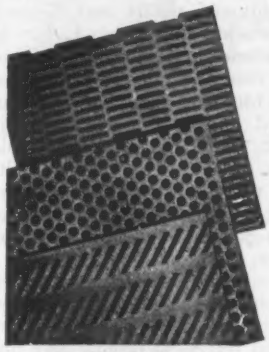

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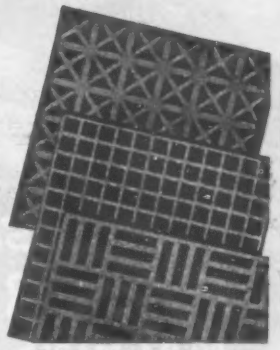

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celed. Some weakness in unprepared material has developed with reductions up to $3 reported. Consumers are assuming an attitude of watchful waiting until the confusion resulting from the end of the Pacific war clarifies. Scrap inventories at consumers' plants and dealers' yards are low, an important factor in sustaining present price levels. Good scrap grades continue scarce, with relatively small tonnages originating from shipyards and railroads. Pennsylvania Railroad's list, which closed last week, involved only 5000 tons of heavy melting steel, all of which probably will be allocated out of this district. Production of turnings is off substantially due to cancellation of shell contracts.

St. Louis — Scrap shipments reached the lowest point of the war period when surrender was announced. No orders are being canceled but new buying has disappeared. Reserves are fair. Demand declined when five furnaces were shut down for repairs long overdue. Manpower shortage still is a major factor in short shipments and dealers expect no improvement for some time.

Buffalo — Scrap cancellations are limited to overdue orders. Inquiry declined and no new sales have been made. Contracts are being covered at ceilings. Indications that civilian needs for steel will sustain ingot production at a high rate are bolstering the situation. Curtailed ingot operations during the transition have enabled a leading mill consumer to replenish seriously depleted stocks. Considerable tonnage is under contract for early shipment from Duluth, New England and the Seaboard, expected to be cleared before the end of navigation.

Cincinnati — Lack of new orders since V-J Day has caused softness in the iron and steel scrap market, even though the situation appears basically sound. Dealers and consumers alike have taken a waiting attitude, as if they expected a return of more or less speculative activity. Demand is certain to be at high level, from steelmakers and foundries, and stocks are none too large, considering the season. Some scrap items will be in diminished supply because of cutbacks.

Los Angeles — No. 1 heavy melting steel from shipyards is disappearing as yards reduce operations. To meet expected heavier demand from mills dealers are increasing collection efforts above wartime rate. While mill needs are not yet clearly outlined a slow rise to ceiling prices is expected. Prices have been consistently below OPA maximums since the war began. While WPB allocation orders for scrap to the East have not been revoked this action is expected. More favorable markets are expected by dealers.

Seattle — Steel mills have fairly low inventories of scrap and continue buying at $14.50, delivered. Supplies are ample and with much new business in sight are expected to continue taking in tonnage.

Cleveland—Scrap is quiet, melters being out of the market, but shipments are being made on contracts, prices at ceiling. Scrap is scarce because of war cancellations and some orders for borings and turnings will not be filled as war contractors cease shell work. There are practically no turnings available.

New York—Despite the fact that scrap consumers are canceling all unfilled tonnage at expiration of contracts, brokers report they have considerable difficulty getting car numbers from dealers. The inference is that yards still have difficulty getting sufficient labor and are unable to supply prepared material fast enough. Most trade leaders expect steel scrap consumers to exert pressure for lower prices when they re-enter the market. Meanwhile broker prices are largely nominal. Such steel scrap as moves is mainly to Sparrows Point and Lackawanna, though some is shipped to eastern Pennsylvania. Cast scrap demand continues.

Chicago — Consumers have not resumed scrap buying since end of the war and the market is untested. Purchasing is not likely to be resumed on any scale until after Labor Day. In the face of reduced scrap production for some time to come, and the fact that steelmaking operations resumed the first week after Jap surrender at an 80.5 per cent rate, or only 13 per cent below the level in the week preceding surrender, would suggest that ceiling prices are likely to remain in effect.

Boston — Unprepared heavy melting steel, 200 tons, Watertown arsenal, sold at $0.80 lower, or $9.26, to a dealer, but consumer prices are at ceilings despite lack of buying. Shipments against old orders are about complete and prices may be tested with new buying next month. Melters are holding more rigidly to specifications with rejections and markdowns; some cancelling of delayed shipments is reported. Firming factors are lack of alloy-free carbon steel and small supply of unprepared in dealers' yards or at source. There is ample alloy material, both turnings and solids.

Philadelphia — In absence of consumer buying steel scrap prices are nominal. Indications point to lower prices when purchases are resumed. Already some broker purchases have been at lower levels where tonnage can be applied to existing orders. However, there has not been enough of this to justify revisions in the normal consumer market for steel scrap. Many consumer contracts are nearing completion and brokers do not wish to be caught with such tonnages as they can buy now at concessions, for fear prices will not be low enough to handle them profitably on new consumer contracts. Cast grades are firm, with supply short.

Warehouse . . .

Warehouse Prices, Page 166

Pittsburgh — In contrast with the situation at the close of World War I, steel warehouse interests are in a considerably better position, for their customers' inventories as well as their own are much lower as a result of CMP regulations, while increases in steel prices have been held in check and consequently there will not be the danger of a sharp reduction in dollar valuation of inventories that occurred soon after the close of the former war.

Shipments out of warehouse stocks are off sharply from that just prior to defeat of Japan, with aggregate deliveries for last half of this month expected to be between 50 and 60 per cent below the tonnage shipped in the first half. A considerable proportion of this decline in shipments is expected to be restored

as civilian production gets under way. However, many distributors' wartime customers will resume buying from normal steel mill sources, which means an end to the practice of mill lot purchases from warehouses and consequently a decline in overall shipments.

Los Angeles — Demand for steel from warehouse has shown no decline as transition to peace gets under way. Greatest demand is for sheets, with nails second, with distributors virtually out of stock. Pipe and tubes show least depletion, though this condition is thought to be temporary.

St. Louis — Cancellations of warehouse orders, especially for ship, aircraft and munitions steel, are heavy. Continuing low inventory prevents filling a new rush of civilian orders but warehouses expect improvement in stocks within 60 days.

Iron Ore . . .

Iron Ore Prices, Page 166

Consumption of Lake Superior iron ore in July totaled 6,532,273 gross tons, compared with 6,397,091 tons in June and with 7,371,733 tons in July, 1944, according to figures by the Lake Superior Iron Ore Association, Cleveland. Cumulative consumption to Aug. 1, 1945, was 46,878,576 tons, compared with 51,661,963 tons in the comparable period in 1944.

Ore on hand at furnaces and Lake Erie docks Aug. 1 totaled 29,485,221 tons, compared with 32,069,216 tons a year earlier. Of 195 blast furnaces in the United States and Canada 165 were in blast Aug. 1, 158 in the United States and seven in Canada. This compares with 162 and seven a month earlier.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1220 tons, warehouse and enameling building, St. Louis, for American Stove Co., to Mississippi Valley Structural Steel Co., Decatur, Ill.; Gamble Construction Co., St. Louis, contractor; bids July 15.

650 tons, assembly building, Memphis, Tenn., for Ford Motor Co., to Ingalls Iron Works Co., Birmingham, Ala.; bids June 14.

600 tons, three-story plant addition, Bridgeport Brass Co., Bridgeport, Conn., to Deleston Steel Co., Englewood, N. J.; O. F. Burghart, Bridgeport, general contractor.

500 tons, plant for Continental Can Co. at Van Wert, O., to Bethlehem Steel Co., Bethlehem, Pa., through Sordoni Construction Co.

457 tons, 30 pile drivers, Bureau of Yards and Docks, U. S. Navy, Chicago, to Grand Iron Works, New York.

397 tons, factory building, Danville, Ill., for F. L. Jacobs Co., to Mississippi Valley Structural Steel Co., Decatur, Ill.

220 tons, turbine room and boiler house, Rockford, Ill., for Central Illinois Electric & Gas Co., to American Bridge Co., Pittsburgh; Stone & Webster Corp., Boston, engineers; bids June 28.

205 tons, factory and office building, Modine Mfg. Co., Racine, Wis., to Wisconsin Bridge & Iron Co., Milwaukee; bids Aug. 6.

200 tons, warehouse, Chicago, for Hinde & Dauch Paper Co., to Joseph T. Ryerson & Son Inc., Chicago.

150 tons, including plates, 178-foot steel cargo ship for Puget Sound Freight Lines, to Reliable Welding Works, Olympia, Wash.

100 tons or more, one-story, 120 x 145-foot building, Westinghouse Electric Corp., East Springfield, Mass., to Haarmann Steel Co., Holyoke, Mass.; reinforcing bars to A. D. Donald & Co., Springfield; Ley Construction

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SALEM, OHIO

Co., Springfield, general contractor.

Unstated, $3,500,000 drydock for British Admiralty, to Western Bridge & Steel Fabricators Ltd., Vancouver, B. C.

STRUCTURAL STEEL PENDING

6000 tons, closures for pontoons, for Bureau of Yards & Docks, U. S. Navy, Chicago; bids Aug. 16; program canceled.

2000 tons, factory building, Pullman-Standard Car Mfg. Co., Chicago.

1300 tons, hinge bars for pontoons, for Bureau of Yards & Docks, U. S. Navy, Chicago; bids Aug. 10; program canceled.

1100 tons, parts buildings, Houston, Des Moines and Seattle, for Ford Motor Co.; bids Aug. 27.

500 tons or more, including plates, five steel trawlers; bids in to H. C. Hanson, Seattle, naval architect.

400 tons, truck and coach shop, Milwaukee, for Chicago, Milwaukee, St. Paul & Pacific Railroad; bids Aug. 13.

400 tons, factory building, Maremont Automotive Products Inc., Chicago.

300 tons, branch store for Arnold Constable & Co. at Hackensack, N. J.; bids Aug. 31.

300 tons, three bridges at Allendale, N. J.; bids opened by Bergen County officials.

250 tons, rolling platform for Navy at Bayonne, N. J.; Arthur Vennirie, Elizabeth, N. J., low.

250 tons, laboratory addition for Bell Telephone Co., Murray Hill, N. J.; bids opened.

Unstated, 260-foot and 156-foot steel spans, Lewis county, Washington; bids soon to State Highway Commission, Olympia, Wash.

Unstated, redecking Eleventh street bridge, Tacoma; Cascade Contractors, Seattle, low, $131,809.

REINFORCING BARS . . .

REINFORCING BARS PLACED

700 tons, plant, Philco Corp., Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa., through John S. Steele Co., contractor.

350 tons, welded wire mesh, FA route 5 Sec. 21-R, Logan county, Illinois, for State Highway Commission, to Ceco Steel Products Corp., Chicago; O'Connor Construction Co., Springfield, Ill., contractor; bids Aug. 3.

250 tons, building, International Printing Ink Division, Interchemical Corp., Chicago, to Joseph T. Ryerson & Son Inc., Chicago; Avery Brundage Co., Chicago, contractor; bids Feb. 3.

100 tons, Protestant Deaconness Hospital, Evansville, Ind., to Laclede Steel Co., St. Louis; bids July 30.

100 tons, three-story plant addition, Bridgeport Brass Co., Bridgeport, Conn., to Topper & Griggs, Hartford, Conn.; O. F. Burghart, Bridgeport, general contractor.

REINFORCING BARS PENDING

1284 tons, welded wire mesh, for Illinois State Highway Commission; 233 tons, SBI route 18 Sec. 15-R, Kendall and DeKalb counties; 301 tons, FA route 13, Sec. 2-2, Lawrence county, and 171 tons, Sec. 3-2 of same route; 185 tons, FA route 5 Sec. 20-R, Logan county, and 321 tons Secs. 18-R and 17-R-1 of same route in McLean county; 73 tons, FA 34 Sec. 29-R, Will county; bids Aug. 17.

210 tons, diagnostical hospital, Elgin, Ill., for U. S. Veterans Administration; W. E. O'Neil Construction Co., Chicago, low on general contract; bids Aug. 14.

200 tons, grain elevator, H. W. Rickel & Co., Detroit.

132 tons, unit of Deschutes project, Oregon; W. C. Thompson, San Francisco, low, $245,200.

100 tons, power house, Binghamton, N. Y.

100 tons, wall and appurtenant works, Mill Creek, contract No. 4, Cincinnati.

Unstated, tumor hospital, Hines, Ill., for U. S. Veterans Administration; bids Sept. 4.

PIPE . . .

CAST IRON PIPE PLACED

350 tons, Fourth avenue N.E. improvement, Seattle, to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

CAST IRON PIPE PENDING

1000 tons or more, 12, 8 and 6-inch, for Everett, Wash.; bids to J. P. Sugars, city clerk, Aug. 28.

Unstated, 5000 feet cast iron and other items for Port Orchard, Wash.; Matt Malaspina, Seattle, low, $152,096.

Unstated, Wilkeson-Prospect district, Tacoma, Wash.; 16 and 12-inch, estimated at $92,236; bids soon.

PLATES . . .

PLATES PENDING

350 tons, top plates for pontoons, for Bureau of Yards & Docks, U. S. Navy, Chicago; bids Aug. 17; program canceled.

RAILS, CARS . . .

RAILROAD CARS PLACED

Baltimore & Ohio, 350 seventy-ton steel cement hopper cars, to American Car & Foundry Co., New York.

Denver & Rio Grande Western, 200 seventy-ton steel ballast cars, to American Car & Foundry Co., New York.

Detroit, Toledo & Ironton, 100 seventy-ton covered hoppers, to Greenville Steel Car Co., Greenville, Pa.; in addition to 100 previously placed.

Industry Struggles to Arrange for Reconversion

(*Concluded from Page* 71)

ample, experiencing only a 24-hour interruption by virtue of ample orders on hand for automotive carbon steel. Ford open hearths and mills were halted for five days, as was the plant of Rotary Electric Steel Co.

Optimistic At Cincinnati

CINCINNATI—Optimism, tempered by realization of serious problems to be solved, pervades this district as the iron and steel industry turns to peacetime business.

Cutbacks in machine tools demand came months ago, so that only light effects are anticipated as a result of Japan's surrender. Foundries will try to expand the melt, to attack the backlog of civilian needs which had so long been pushed aside to meet the calls of Mars.

Outlook Favorable at St. Louis

ST. LOUIS—Heavy industry's changeover to peace in the St. Louis district is confused so far but indications are there will be no large labor layoffs soon in the iron and steel and metalworking industries. This is in contrast, however, to a prediction of 80,000 unemployed by the year's end in the area's manufacturing and services.

Cutbacks in steel sheets, tin plate, wire and a few other rolling mill products have been negligible to date. However steelmakers are confident their existing and prospective civilian backlogs will keep them at capacity a year or more. Physical reconversion problems at steel mills are almost nil.

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STYLE "M"
ROLL FEEDS

At left—Standard Style "M" Littell Roll Feed, equipped with a 3-roll Straightener, mounted on left-hand side of an O.B.I. press, feeding left to right. *Below*—same unit, including Littell Automatic Centering Reel.

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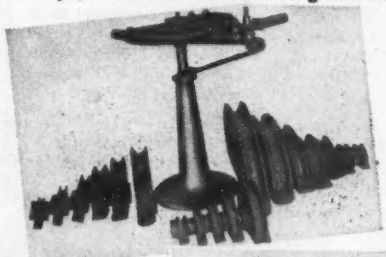

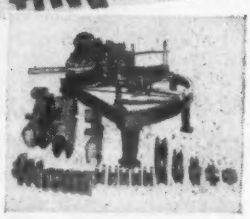

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FLEXIBLE SHAFT EQUIPMENT

CONSTRUCTION AND ENTERPRISE

MICHIGAN

DETROIT—Arrow Steel Co., 12160 Cloverdale, has been incorporated with $50,000 capital to fabricate steel and manufacture metal products, by Robert D. Duffield, 18307 Birwood, Detroit.

DETROIT—Tonkin Mfg. Co., 8642 Gratiot Ave., has been incorporated with 20,000 shares no par value to do general machine shop business, by Charles Tonkin, same address.

DETROIT—Electro-Mechanical Devices Co., 49 Selden St., has been incorporated with $50,000 capital to conduct a general manufacturing business, by Harry L. Wise, 10240 West Outer Dr., Detroit.

DETROIT—Parkside Engineering & Mfg. Co., 1858 East Seven Mile Rd., has been incorporated to manufacture tools, dies, jigs and fixtures, by William B. Stevenson, 1044 Eastlawn St., Detroit.

GRAND RAPIDS, MICH.—Kent Castings Corp., 200 Garden St. SE, has been incorporated with $50,000 capital to manufacture aluminum and zinc castings, by Henry F. Worfel, 1316 Front St. NW, Grand Rapids.

HASTINGS, MICH.—E. W. Bliss Co., manufacturer of presses and sheet metal working equipment, etc., will let contract soon for a one-story machine shop addition 150 x 200 feet and alterations to present shop, to cost about $200,000. J. H. Tredennick is manager.

LANSING, MICH.—Melling Forging Co., Alfred W. Bowes, acting president, will expand facilities by new machine shop, office and other buildings.

MONROE, MICH.—Rossin Tool & Machine Co., 402 South Monroe St., has been incorporated with $125,000 capital to manufacture tools, jigs, dies, fixtures and machines, by James Rossin, 18219 San Juan Dr., Detroit.

OWOSSO, MICH.—Gladden-Haas Inc., 918 East Exchange St., has been incorporated with $50,000 capital to manufacture machinery, by Charles A. Gladden, 515 Clark Ave., Owosso.

SALINE, MICH.—Universal Die Casting & Mfg. Corp., 232 Monroe St., Saline, has been incorporated with $150,000 capital to operate a die casting, plating and general manufacturing business by Clifford H. Simmons, above address.

MASSACHUSETTS

ATTLEBORO, MASS.—Metals & Controls Corp., Forest St., has let contract to Rowley Construction Co., 260 Central Ave., Pawtucket, R. I., for a one-story 120 x 160-foot plant, to cost over $40,000.

CANTON, MASS.—Draper Bros. Co., Draper Lane, has let contract for a boiler plant addition to C. C. Temple Co., 184 Boylston street, Boston, to cost about $40,000.

CONNECTICUT

ANSONIA, CONN.—City, T. J. Nelligan, mayor, City Hall, plans a sewage disposal and treatment plant to cost about $400,000. Havens & Emerson, 233 Broadway, New York, are consulting engineers. V. B. Clarke, 356 Main street, Ansonia, is city engineer.

NEW HAVEN, CONN.—Brite Products Division of Ecko Products Co., 1940 Cicero Ave., Chicago, plans a plant addition on Whalley Ave., to cost over $40,000.

SOUTH NORWALK, CONN.—Remington Rand Co., 785 Main street, has let contract to E. & F. Construction Co., 94 Wells street, Bridgeport, Conn., for a four-story 60 x 200-foot factory and office building on Meadow street, estimated to cost $175,000. Fletcher Thompson Inc., 214 State St., Bridgeport, are engineers.

NEW YORK

BETHPAGE, N. Y.—Grumman Aircraft Corp. will take bids soon for a plant addition and alterations to cost about $450,000.

ROME, N. Y.—Rome Cable Corp. has WPB authorization for a plant addition of about 120,000 square feet. E. W. Gundstrom is chief engineer.

OHIO

AVON, O.—B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, has let contract to John Gill & Son, Bulkley Bldg., Cleveland, for process building, laboratory and machine shop, boiler house, gate house, sewage disposal plant and installing equipment for pilot plant, estimated to cost $600,000. Bonfield & Cummings, 1900 Euclid avenue, Cleveland, are architects.

CANTON, O.—Canton Metal Decorating Co., 2808 Winfield Way NE, has plans in preparation for a one-story plant to cost about $100,000.

CLEVELAND—Ohio Machinery Co., 6600 Schaaf Rd., has let contract to L. W. Schmidt, 10,000 Granger avenue, Garfield Heights O., for a one-story 150 x 200-foot plant, to cost about $50,000. E. Sidney Snyder, 1740 East Twelfth St., is engineer.

KENT, O.—Twin Coach Co. has plans under way for plant buildings at Tallmadge and Stow Sts., to cost about $100,000.

MIDDLETOWN, O.—American Rolling Mill Co., has let contract to F. H. McGraw Construction Co., First American Bank Bldg., for a galvanizing works building at East Works, estimated to cost $1,200,000.

NILES, O.—General Electric Co., Nela Park, Cleveland, has let contract to Heller-Murray Co., 222 West Rayen Ave., Youngstown, for a 100 x 228-foot addition, to cost about $150,000.

TOLEDO, O.—Baltimore & Ohio railroad, A. C. Clarke, chief engineer, Baltimore and Charles Sts., Baltimore, and New York Central railroad, J. W. Pfau, chief engineer, 466 Lexington Ave., New York, plan joint coal and oil terminal on Lake Erie, to cost upwards of $15 million.

TOLEDO, O.—Pure Oil Co., Bay Shore and Otter Creek Rds., plans construction of a petroleum coke plant to cost from $2 to $3 million. Lummus Co., 420 Lexington avenue, New York, is engineer.

ILLINOIS

CHICAGO—Burton Mfg. Co., 3855 Lincoln Ave., has let contract to B. W. Handler Co., 12 East Thirteenth street, for a one-story plant at 2157 North California Ave., to cost about $45,000. B. Krauss, 1321 North Winnemac Ave., is architect.

ELGIN, ILL.—Majestic Radio & Television Corp., 2600 West 50th St., Chicago, has let contract for foundation for factory and office building to cost about $800,000. A. Epstein, 2001 West Pershing Rd., Chicago, is engineer.

ROCKFORD, ILL.—Inland Machine Tool Co., Luther S. Augsburger, president, will build a plant 60 x 140 feet.

INDIANA

INDIANAPOLIS—Climax Machinery Co., Morris and Pennsylvania Aves., will rebuild six buildings destroyed by fire, to cost $150,000 or more.

VINCENNES, IND.—Auto Battery Division of Electric Auto-Lite Co., Champlain and Mulberry Sts., Toledo, O., plans a battery plant to cost $150,000 or more with equipment.

KENTUCKY

MURRAY CITY, KY.—Tappan Stove Co., Mansfield, O., has plans under way for a stove manufacturing plant here, to cost about $500,000.

TENNESSEE

CHATTANOOGA, TENN.—O. B. Andrews Co.

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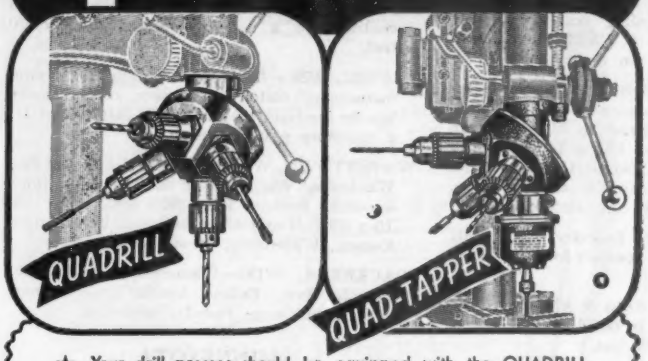

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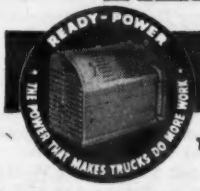

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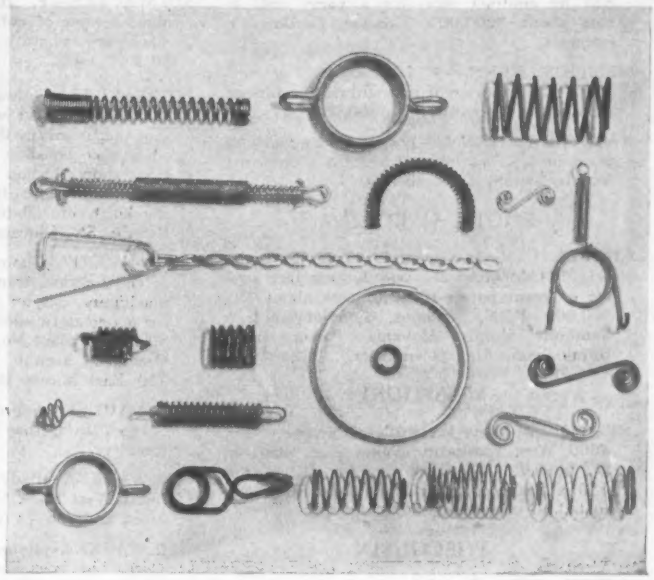

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will let contract soon for a paper mill to cost about $200,000. Edward Faulkner is manager.

MEMPHIS, TENN.—J. I. Case Co., Racine, Wis., manufacturer of agricultural machinery, plans plant to cost about $300,000.

NASHVILLE, TENN.—Tennessee Foundry & Machine Co. has let contracts for a one-story foundry at 806 Sixteenth Ave. North.

SOUTH CAROLINA

CHARLESTON, S. C.—South Carolina Power Co., 141 Meeting St., will let contract soon for a steam power plant to cost about $2,500,000. F. N. Williams, Commonwealth & Southern Corp., Alabama Power Bldg., Birmingham, Ala., is engineer.

MISSSOURI

ST. LOUIS—Barry-Wehmiller Machinery Co., 4660 West Florissant avenue, has plans by O. Janssen, 721 Olive St., for a two-story 130 x 260-foot glass factory building, estimated to cost $250,000.

WISCONSIN

BIRON, WIS.—Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis., plans a one-story boiler house and turbine building 78 x 100 feet.

GREEN BAY, WIS.—Metal Products Co. is building a one-story plant addition 50 x 80 feet.

LA CROSSE, WIS.—Cheney Mfg. Co. has let contracts for a one-story factory 70 x 100 feet.

MADISON, WIS.—Madison Pattern Works has let contract for a one-story addition.

MILWAUKEE—Central Engineering Co. has been incorporated to manufacture machinery by Howard F. Herzog, 5948 Santa Monica Ave., and associates.

MILWAUKEE—F. Hamacheck Machine Co., manufacturer of cutting, canning and sawing machinery, plans a one-story plant addition 30 x 70 feet.

MILWAUKEE—Chicago, Milwaukee, St. Paul & Pacific railroad will let contracts soon for shop additions in the Menominee valley, including coach shop addition 136 x 355 feet, truck shop addition 54 x 455 feet, alterations to battery shop, traveling cranes, portable car hoist, etc. Battey & Childs, 231 South LaSalle St., Chicago, are engineers.

MILWAUKEE—Chain Belt Co., manufacturer of construction, transmission and power plant machinery, has let contract to Klug & Smith for a one-story addition 135 x 340 and 60 x 80 feet at plant No. 4, South 45th street and Greenfield avenue. Eschweiler & Eschweiler, 720 East Mason street, are architects.

MILWAUKEE—Supreme Foundry Inc., 1901 South 77th St., has let contract for a one-story foundry.

MILWAUKEE—Badger Brass & Aluminum Co., 5120 West State St., is building a one-story plant addition 74 x 95 feet.

MILWAUKEE—Roto-Met Centrifugal Casting Corp. has been incorporated by Kenneth J. Yonker, 561 North Fourteenth street, and associates.

MILWAUKEE—Modern Foundry & Products Inc. has been incorporated to operate a general foundry and machine shop, by R. N. Jost, 6811 Cedar St., and associates.

MILWAUKEE—Rex-O-Graph Inc., manufacturer of duplicating machines, is building a one-story plant addition 49 x 60 feet at 3900 North Second St.

MILWAUKEE—Hydro Mfg. Co. has been incorporated to manufacture hydraulic and electric shears, pumps, etc., by Darwin B. Strickland, 260 East Gauer St., and associates.

OCONOMOWOC, WIS.—Precision-Built Homes Corp. has leased factory space for manufacture of prefabricated homes. The company was incorporated recently with Sidney F. Dwyer, Milwaukee, as president.

PLYMOUTH, WIS.—Cleveland Container Co., manufacturer of containers, radio parts, etc., has let contract for a plant addition, one story, 40 x 200 feet.

RACINE, WIS.—Haas Foundry Co. has let contract for a one-story foundry 65 x 70 feet.

RACINE, WIS.—Twin Disc Clutch Co., manufacturer of clutch and power takeoff units, has let contract to Johnson & Henrickson for a one-story plant addition.

WATERTOWN, WIS.—Waukesha Foundry Co., Waukesha, Wis. will let contract soon for a one-story foundry 64 x 300 feet, sand shed 15 x 64 feet and office building, here. Arthur Kuenzi, Watertown, is engineer.

WAUKESHA, WIS.—Waukesha Foundry Co., Lincoln Ave., Roland Smith, general manager, plans large foundry addition.

MINNESOTA

LITTLE FALLS, MINN.—Louis J. Litchy is building a one-story plant for manufacture of snow plows and road grading machinery.

MINNEAPOLIS—Hove Engineering Co., manufacturer of automotive parts, has let contract to Standard Construction Co., for a one-story plant 75 x 85 feet, at 601 Eleventh avenue, South.

MINNEAPOLIS—Freeman Mfg. Co., machine tool manufacturer, has let contract for a one-story plant 30 x 150 feet at 3320 East 41st st.

MINNEAPOLIS—Wire Specialty Mfg. Co., 100 Bryant Ave. North, manufacturer of wire products, will build a one-story plant addition.

SLEEPY EYE, MINN.—City will open bids Sept. 18 for steam generating unit for municipal generating plant. Pfeifer & Shultz, Wesley Temple building, Minneapolis, are engineers.

ST. PAUL—A. O. Smith Corp., Milwaukee, will expand plant here by installation of new machinery and equipment costing about $700,000. R. E. Cook is manager.

IOWA

CEDAR RAPIDS, IOWA—McNall Machinery & Supply Co., distributor of road and construction machinery, plans repair and service shop on Sixth St. SW.

ESTHERVILLE, IOWA—City, V. H. Sidles, clerk, will open bids Sept. 5 for an addition to the municipal power plant, including 2000 to 2500 hp diesel engine and a 2000 to 2500 hp convertible diesel engine for oil or gas, and auxiliary equipment.

FORT DODGE, IOWA—National Gypsum Co. has let contract to Border Construction Co., Buffalo, for addition to its gypsum plant, including rock crusher plant and conveyor gallery.

LECLAIRE, IOWA—Ellwyn Kroeger, resigned as chief engineer of the Maytag Co., Newton, Iowa, will establish an aluminum foundry in building recently purchased. An attachment for power lawnmowers will also be manufactured.

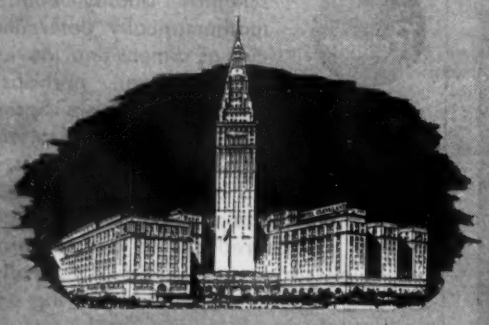
UTAH

SALT LAKE CITY, UTAH—Arnold Machinery Co. has let contract for a warehouse and office building at Second St., and Rio Grande Ave., by W. E. Rydberg Co., 207 Interurban Bldg., Salt Lake City.

CALIFORNIA

LOS ANGELES—Gale Saum is building a machine shop at 1623 Nadeau St., Bell Gardens district, 40 x 50 feet, to cost about $5500.

BURBANK, CALIF.—Coast Sheet Metal Works will build a new plant on Orange Ave., 75 x 138 feet.



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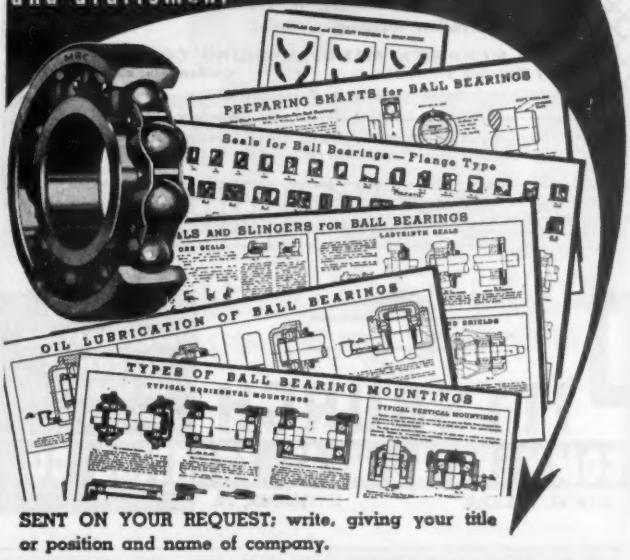
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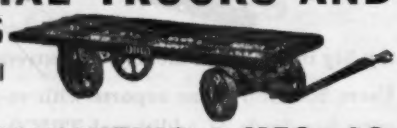

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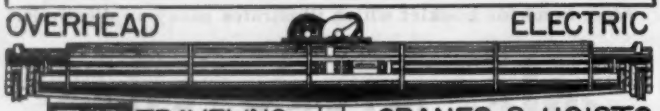

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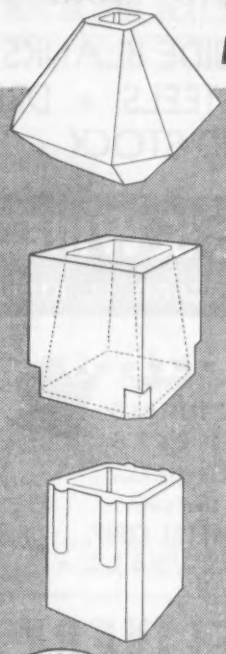

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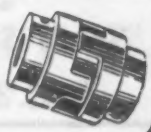

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Accounts Wanted

SALES REPRESENTATION WANTED

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Positions Wanted

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PRODUCTION MANAGER. EXPERIENCED IN planning, scheduling, machine loading and inventory control and small lot production. Machine shop and sheet metal experience also. Address Box 145, STEEL, Penton Bldg., Cleveland 13, O.

Positions Wanted

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